

**SERVICING AND INSTALLING
THE BENDIX HOME LAUNDRY
WITH
COMPLETE WASHING INFORMATION**



**BENDIX HOME APPLIANCES, INC.
3300 WEST SAMPLE STREET
SOUTH BEND, INDIANA, U. S. A.**

PRICE \$1.00

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Introduction

As pioneer manufacturers and the world's largest producer of fully automatic washing machines, Bendix Home Appliances, Inc., presents this Service Book and Manual to assist owners and service men who desire information regarding construction, maintenance, and repair of The Bendix Home Laundry.

While the contained information offers a comprehensive outline of all important service features on product, there are certain fine points of service procedure and money-saving short-cuts which are attained only with actual service experience. Therefore, it is recommended to owners that maintenance and repairs be effected whenever possible by the nearest authorized Bendix Home Laundry service outlet. The name of an authorized service plant will be promptly furnished by the factory upon request.

SECTION I

INSTALLATION OF THE BENDIX HOME LAUNDRY

Careful and economical installations are of the utmost importance because they result in satisfied owners and low costs for the dealer.

Such installations are the result of well laid plans carried out by workmen who have a complete knowledge of installation procedure and problems.

A plan step by step of installation follows:

1. Survey.
2. Proper correlation of:
 - "a" Plumbing—when necessary.
 - "b" Floorwork—when necessary.

"c" The delivery.

"d" The actual installation.

3. Checking the Bendix Home Laundry after it has been installed.
4. Instructing the owner on how to use the Bendix Home Laundry.
5. The post installation check-up.

THE SURVEY (See Figure 1)

In most cases, for the sake of economy, a survey should be made by the dealer in the customer's home and usually no sale should be completed until this survey has been made.

BENDIX HOME LAUNDRY INSTALLATION ORDER

Dealer's Name	Address
Customer's Name	Phone
Address	City
Installation Promised for (7-Day Notice Required)	Location:

General Information

The following steps should be taken before each installation is made in order to insure satisfactory service.

When a sale has been made a dealer representative should contact the customer, in order to assist her in selecting a suitable location for her New Home Laundry. In doing so, care should be used with regard to location, especially in order to eliminate expensive plumbing changes and secondly to insure that the foundation is sufficiently secure.

Our standard installation consists of (1) fastening the Bendix to the floor; (2) attaching hoses to faucets already provided and (3) instructing the user. Post installation check-up by dealer should be made within ten days from date of installation.

INSTALLATION ORDERS WILL NOT BE ACCEPTED WITHOUT THE USE OF THIS FORM.

Type Floor (Wood, Concrete, Tile) Two 4 ft. lengths and one 7 ft. length of hose are standard equipment for each machine. There will be an extra charge for additional hose required.	Will Installation Be Within 4 ft. of Faucets?
---	--

TYPE OF INSTALLATION REQUIRED

CHART No. 1 ☐

- a. Are there individual hot and cold water lines as indicated on Chart No. 1?
- b. Have these faucets male threads so hose can be attached?
- c. If not, have you made arrangements for the installation of faucets?

CHART No. 2 ☐

- a. Where a mixing faucet is used for both hot and cold water lines, 2 valves and T's must be installed as shown on this Chart No. 2. Approximate cost of material and labor by a licensed plumber will be \$5.00. This charge must be made before machine can be installed.
- b. Have you made such changes?

CHART No. 3 ☐

- a. Where a kitchen installation is desired as shown on this Chart No. 3, a licensed plumber should be called to make the necessary plumbing changes before installation can be made.
- b. When will this work be completed?

AN EXTRA CHARGE OF \$2.50 WILL BE MADE FOR SUCH CALLS WE CANNOT COMPLETE BECAUSE OF IMPROPER INSTALLATION ARRANGEMENTS BY THE DEALER.

Figure 1
A Sample Survey Form

With tact, oftentimes the customer can be guided in placing the Bendix Unit so that it can be installed in the most convenient place to avoid excessive plumbing charges. The information obtained during the survey can be recorded on a form similar to Figure 1. If there will be any extra charges for the customer to pay, due to special installation work, such charges should be explained to the customer at the time.

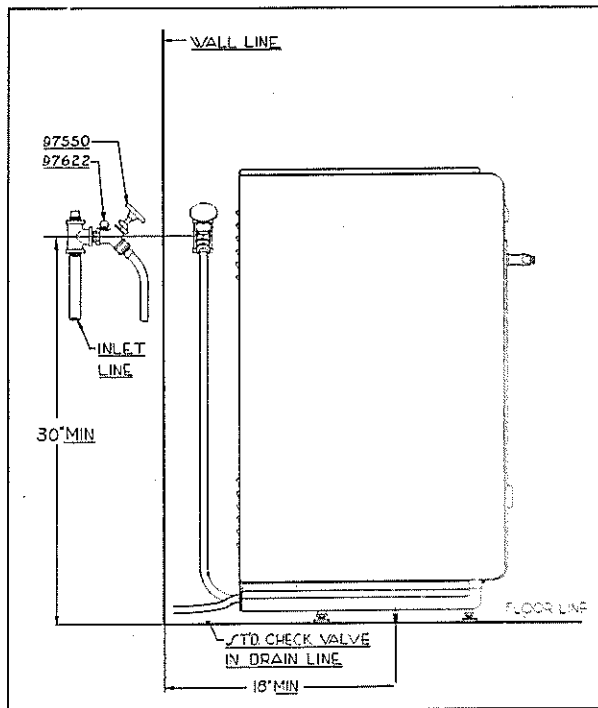


Figure 2
A Permanent Installation

PLUMBING

It is important in this phase of the work that the water pressure be checked to make sure that it is 20 pounds or over and does not exceed 120 pounds. If it exceeds 120 pounds a regulating valve should be installed in the supply pipe to the home so that the pressure can be adjusted to within the limits. Under high pressure conditions such a regulating valve will be beneficial in the house at all points where water is used.

It is important that the pressure be 20 pounds or over, to assure proper filling of the tub in the prescribed time during the soak, washing, and second rinse periods, and to assure sufficient pressure so that the spray rinses will be effective.

Note: Most home shallow and deep well plumbing systems are set for 20 pounds pressure on the low side, with 40 pounds on the high side.

It is also important to inspect the pipes in the home to make sure they are not corroded so that

the necessary volume of water will be obtained. Sufficient pressure may be present but if the pipes are corroded it may be that the proper volume of water cannot be obtained in the unit.

The hot water supply should be checked so that the customer will be assured of hot water of at least 160 degrees Fahrenheit, and that the hot water supply will recover fast enough to furnish water for three or four loads in succession. A hot water tank of twenty or thirty gallons capacity, that will recover in sixty minutes, is sufficient for the successful operation of the Bendix Home Laundry.

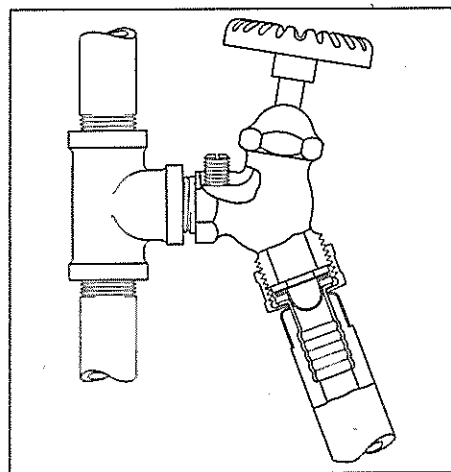


Figure 3
Shut-Off Valve Installation

There are various code regulations concerning permanent drain connections in each locality. Each installation department should familiarize itself with the local plumbing codes to make sure that they are being followed.

Some installation departments that require the services of a plumber have enough volume so they employ one and direct his efforts within their own organization. Others prefer to contract or reach an understanding with plumbers for standard work, such as putting tees in the hot and cold water lines and installing shut-off valves. It is very important that separate shut-off valves be provided for both the hot and cold water. A special valve for this purpose is available from Bendix distributors (part number 97550) at \$.75 each list price. (See Figures 2 and 3.)

In installations like this, the drain is generally hooked over the stationary or set tub. If, however, the installation requires such things as special water lines, pressure regulating valves or special drainage facilities, an estimate should be made by the plumber and the work completed in a neat and orderly manner.

FLOOR WORK

Care must be taken in the floorwork so as to insure a firm foundation for the Bendix Home Laundry and thus prevent any possibility of excessive vibration.

If the installation is to be made on solid concrete at least two inches thick, lead type expansion, anchors can be used by drilling holes with a seven-eighths inch star drill, $1\frac{1}{2}$ inches deep, undercutting the holes with the aid of a small chisel.

When this has been done, the anchor should be placed in the hole and the shell expanded. With lead anchors use expansion tool, part number IT-215. A cement floor template, part number IT-203, should be fastened to this anchor with a mounting bolt, and another hole cut into the concrete of the same depth and the same distance from the wall by locating it by means of the hole provided at the other end of the template. After the second hole has been cut in the concrete, an anchor should be dropped in and the shell expanded the same as it was for the first bolt. The anchors should be just below the surface of the concrete, as is shown in Figure 4.

There are satisfactory methods of anchoring to the floor when the concrete is good but not sufficiently thick to accommodate expansion anchors. In some of such cases expansion shields with threads for machine bolts (see Figure 5) and toggle bolts (see Figure 6) of the correct kind as shown can be used successfully. They are obtainable from most hardware stores.

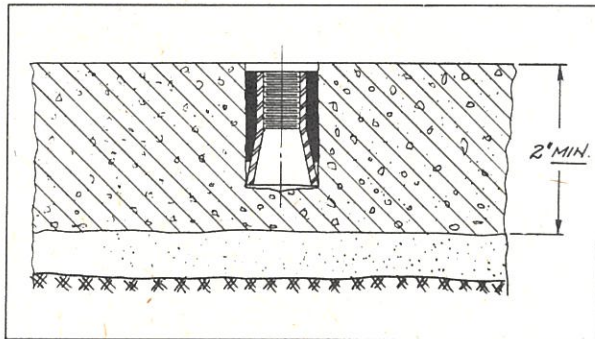


Figure 4
An Anchor Properly Installed

If the concrete is not solid enough to hold expansion anchors or toggle bolts the following installation can be made.

Remove the old flooring and pour a concrete base (at least 6" deep). This new footing can either be made level with the original floor or the unit can be elevated slightly (as shown in Figure 7). Where a new base is poured it is de-

sirable to place the mounting bolts in the concrete (as shown in Figure 7). In all cement work use one part of common cement, or super-cement, with five parts of grout of 40-60 mix. Where a cement block is required (where the Bendix Home Laundry is to be mounted for

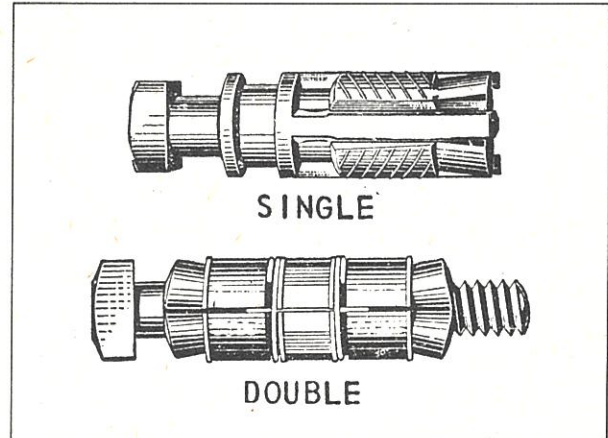


Figure 5
Two Types of Expansion Shields

demonstration purposes, or where the installation is to be made on a marble, tile, or granite floor, and where holes cannot be cut in the floor), a concrete block as shown in Figure 8 can be used. A block this size will weigh approximately 650 pounds.

Mounting bolts should be installed in this type of block when the cement is poured in the same manner as shown in Figure 7.

NOTE: In using inverted bolts as shown in Figures 7 and 9, it is necessary that the bolts extend above the floor not less than $1\frac{1}{2}$ inches and not more than 2 inches.

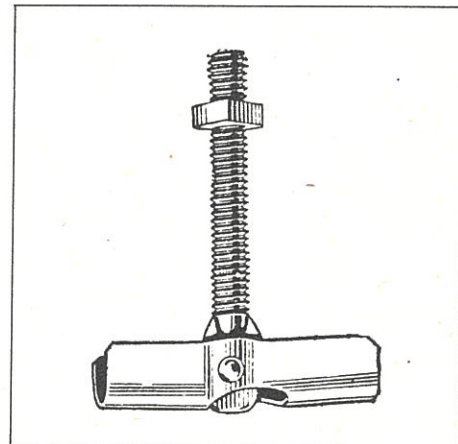


Figure 6
Toggle Bolt

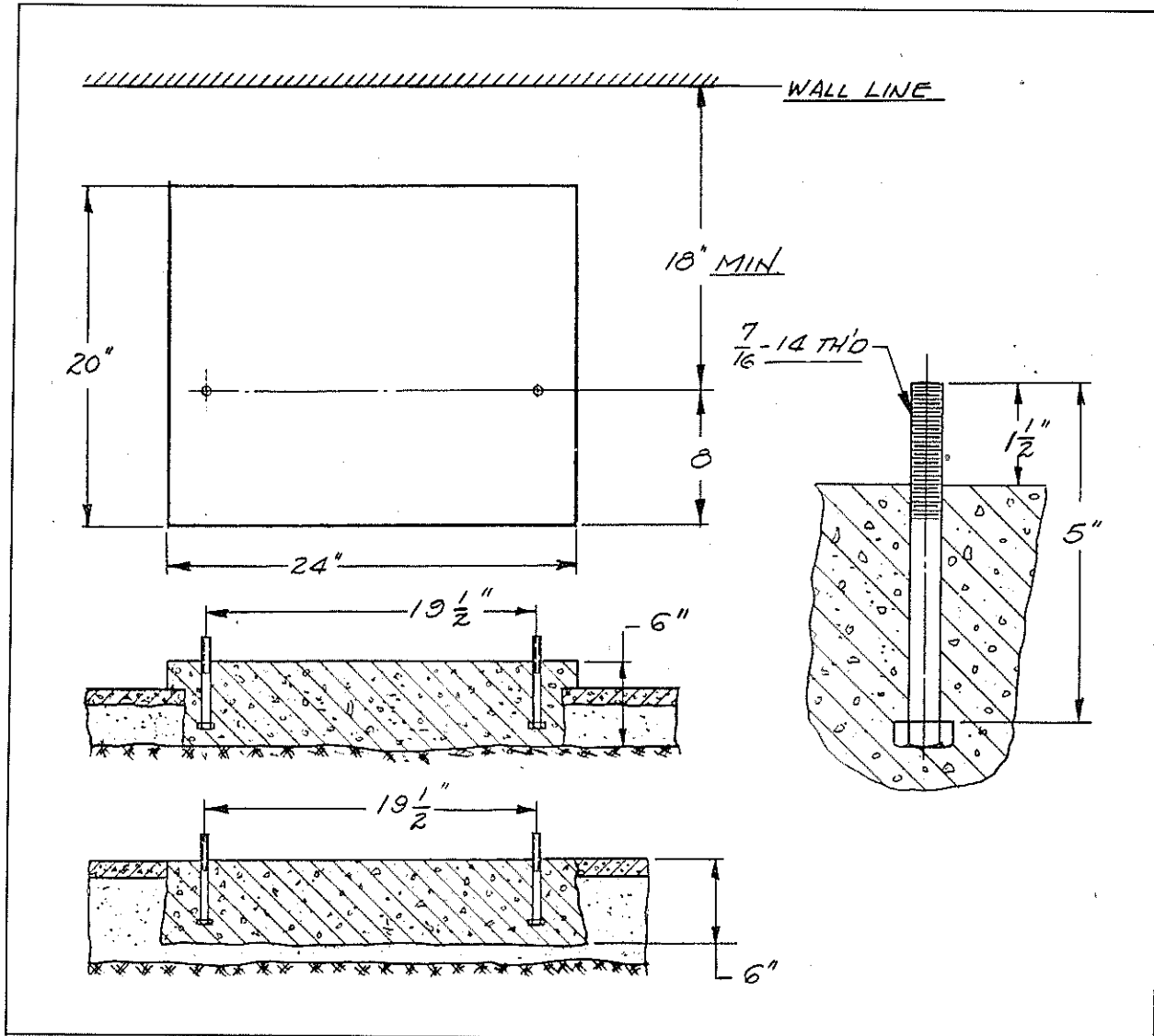


Figure 7
Reinforcing an Old Floor

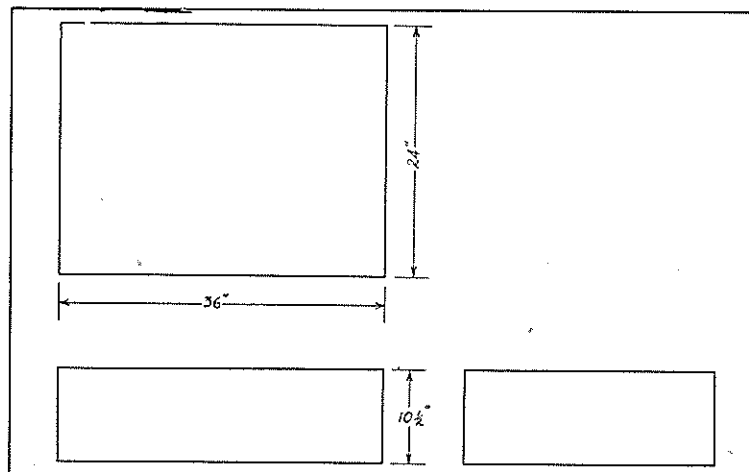


Figure 8
A Concrete Block

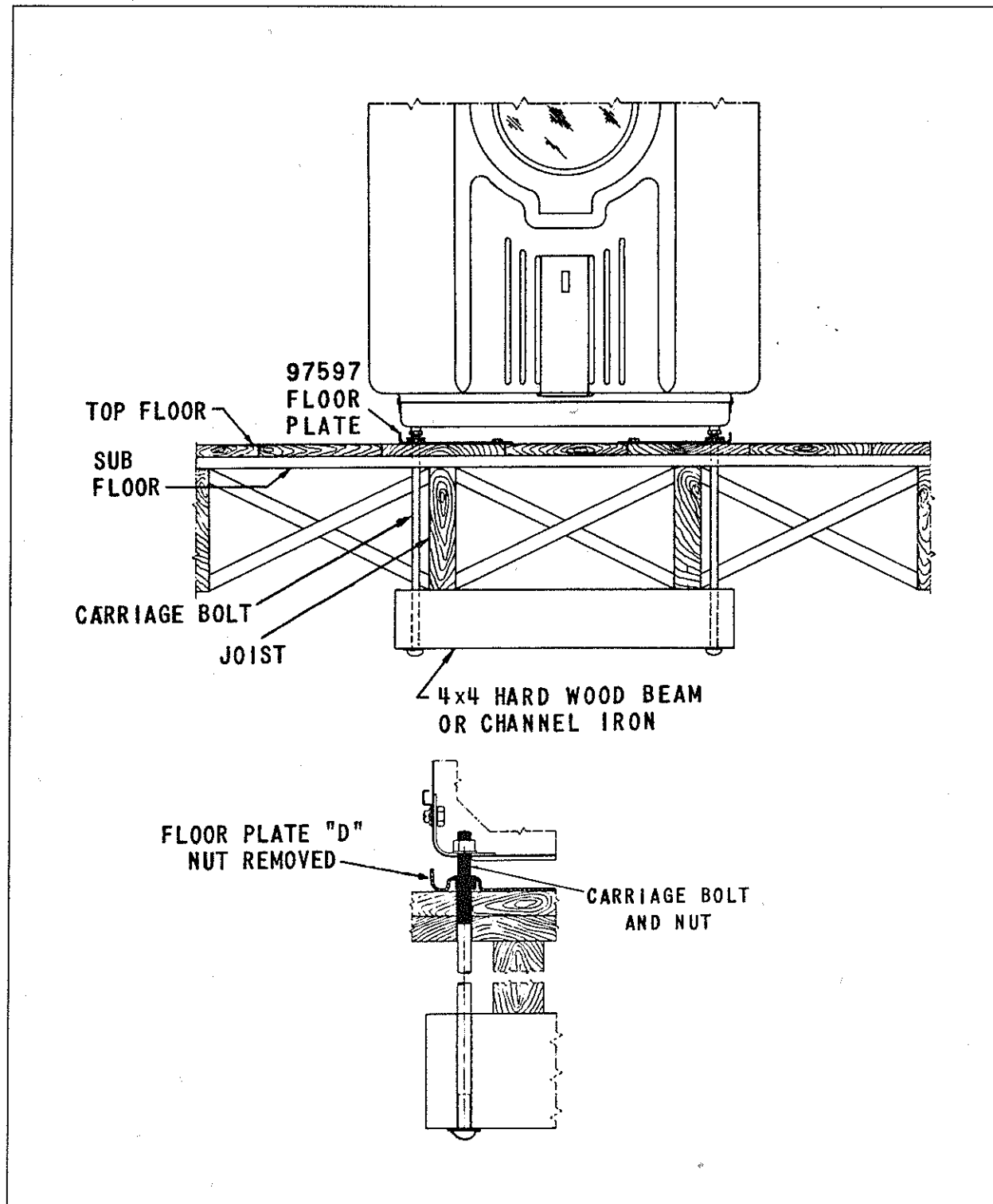


Figure 9
Reinforcing a Wood Floor

Where wood floors are not thoroughly braced, or where the unit is to be mounted a considerable distance from the wall, on a wood floor, it is very desirable to have a 4 x 4 hardwood beam,

or piece of channel-iron placed underneath the joists so that it crosses from two to four joists, and the unit is bolted in place as shown in Figure 9. This will insure a rigid foundation.

ACTUAL INSTALLATION

1. Pull nails from base of shipping crate, and lift the upper part of the crate straight up. Do not tilt the upper part of the crate, as it may scratch the painted surfaces.

2. Remove the shipping crate base by tilting the unit and removing the four bolts that fasten the crate base to the base of the unit. (Fig. 10)

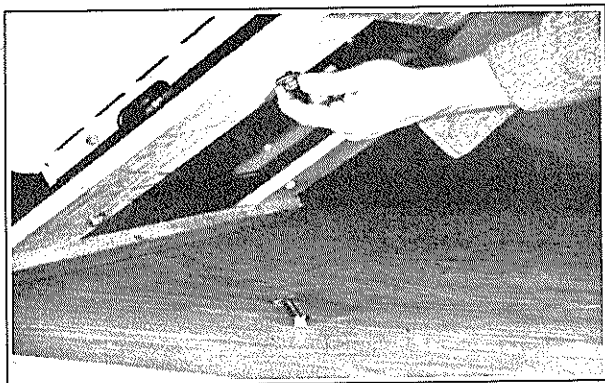


Figure 10
Removing Crate Base

3. Release the motor and transmission assembly. To do this, tilt the unit and loosen the $\frac{1}{4}$ -inch cap screw the head of which can be seen just below the transmission housing. As soon as the bolt has been turned out of the boss in the transmission housing, tilt it toward the back of the base and the sleeve which supported the motor will drop out through the elongated slot in the base. (Fig. 11)

4. Unroll the ground wire which you will find coiled up near the drain hose extension and

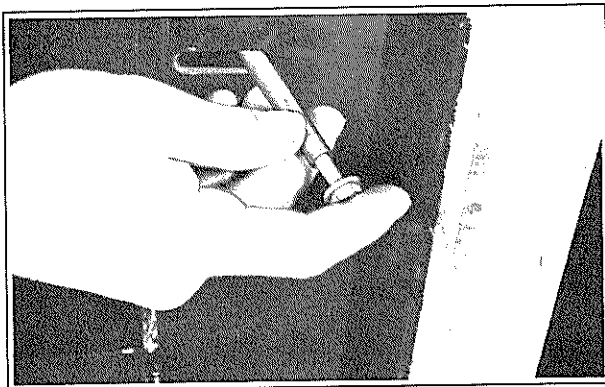


Figure 11
Removing Motor Hold-Down Bolt

start the end through the hole in the base through which the drain hose extension passes.

5. Remove the drain and inlet hoses from the inside of the cylinder. Unwrap the ends of the hoses, making sure to remove from the paper

wrapping the small bag of accessories. Connect the drain hose to the end of the drain hose extension. Connect the inlet hoses to the mixing valve, the red hose fastening to the port marked

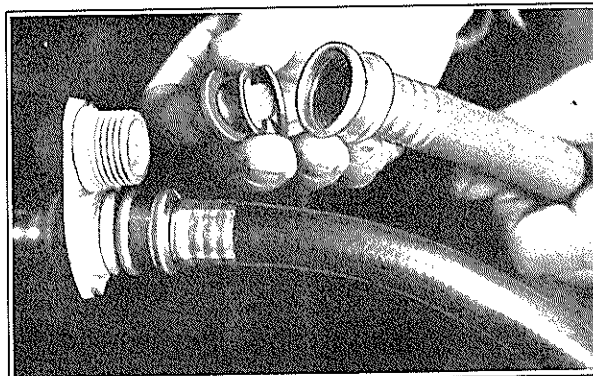


Figure 12
Inserting Hose Screen

“Hot,” and the black hose to the port marked “cold.” The screens provided in the accessory bag should be placed in the ends of the hoses before they are connected to the mixing valve.

7. Place the unit over the anchorage which has been provided, and align the holes in the mounting angles inside the base with the cement floor anchors or wood floor plates. Assemble a lock washer on one of the mounting bolts and, using the thumb and forefinger, through the hole in the mounting angle and start it into the floor anchor. Repeat this operation on the other side of the unit.

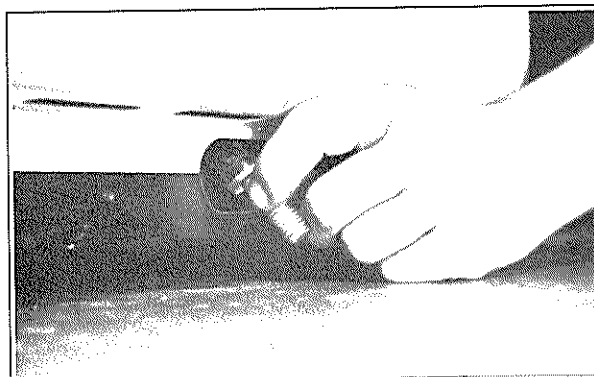


Figure 13
Inserting Anchor Bolt

Remove the leveling spacers from the accessory bag, and place spacers under each leg of the unit as shown in Fig. 14. Determine whether or not the unit is level, and if not, add spacers needed to level it.

Tighten the mounting bolts until sufficient tension is placed on the mounting angles to hold the unit securely in place.

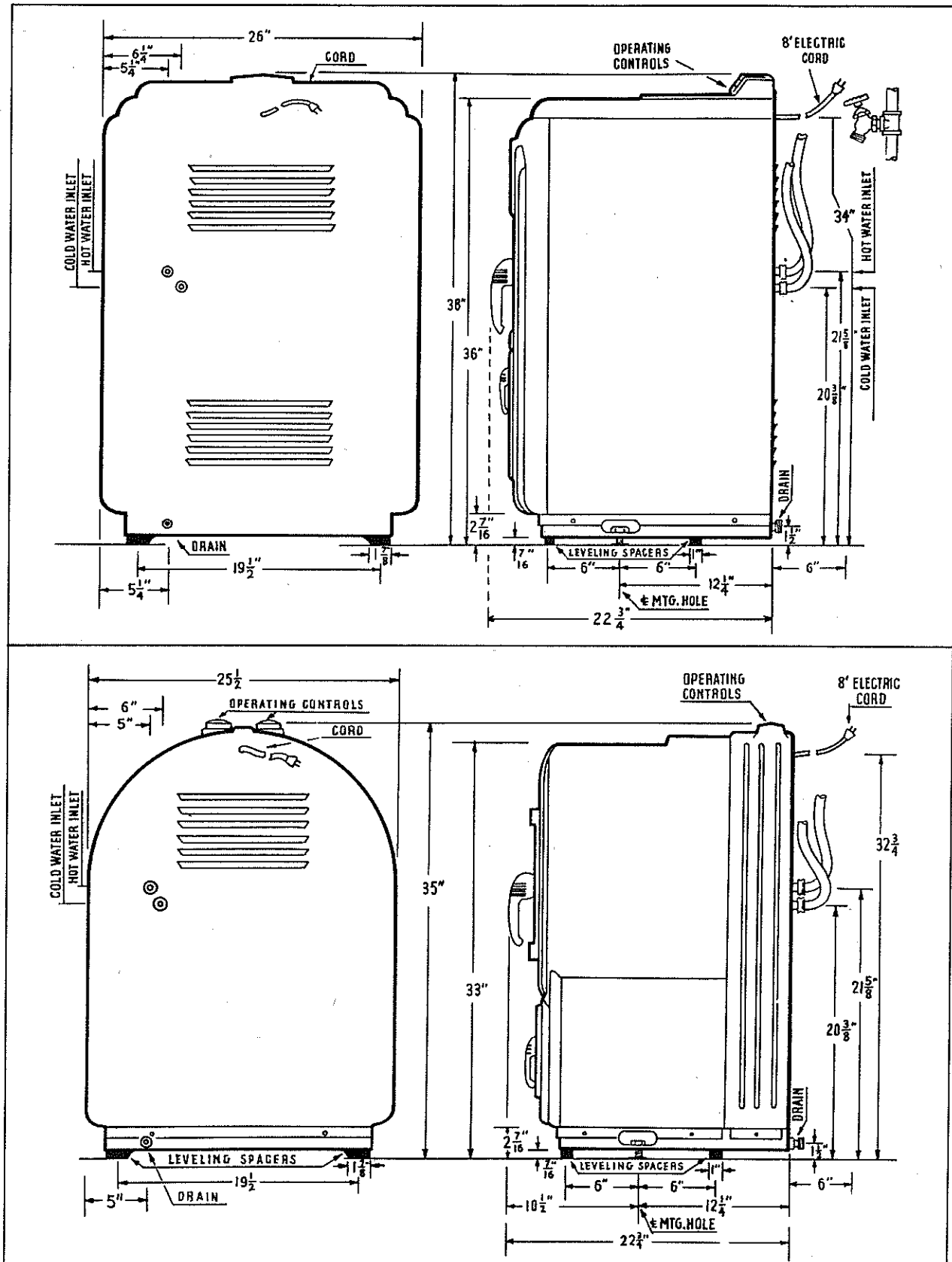


Figure 15
Dimensions—Deluxe and Standard Models

8. Connect the inlet hoses to the shut-off valves, the red hose to the hot water valve and the black hose to the cold water valve. Hang the drain hook over a laundry tray or suitable draining facility.

9. Plug in the power cord.

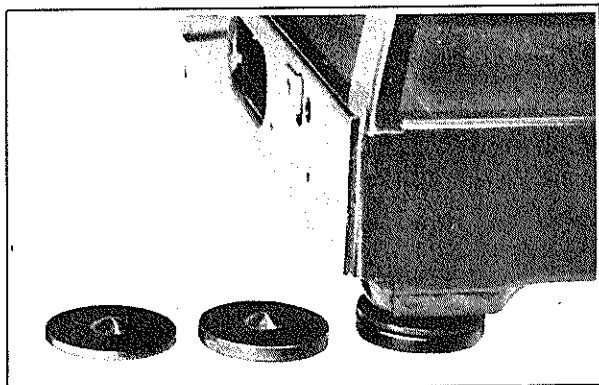


Figure 14
Leveling Spacers

It will be noted that the above installation procedure does not involve the removal of any panels. In case it is necessary to install the unit in very close quarters where the mounting bolts cannot be reached from the outside, the front panel should be removed. This will give access to the mounting bolts and will also permit inserting the necessary leveling washers from the inside of the base.

TESTING AFTER INSTALLATION

Before leaving an installation, run the unit through a shortened cycle to make sure that it is functioning satisfactorily. This, of course, is only good service practice, and it is strongly recommended that every person who installs a unit check it in this manner. Also, if the service man is expected to instruct the owner on using the unit, it may be checked during that time.

It should not be necessary, however, to do more than merely check the unit, as all adjustments are made at the factory and will seldom require any additional attention. The water level is set, and the float is ready for operation; the belt and the transmission vent pipe are in place, and after the motor hold-down bolt is removed (Step 3) the motor is ready to be turned on. The mixing valve is adjusted at the factory and

the temperature of the lukewarm water is checked; since the valve is extremely stable and has little tendency to change after being once set, no attention to it is required from the service man in most cases. All of these facts have assisted materially in shortening and simplifying the Bendix installation.

INSTRUCTING THE OWNER

One of the most important steps in the sale of the Bendix Home Laundry is educating the new owner in the use of the unit so that she will be familiar with all of the things that it will do and be able to take advantage of all the time and labor saving facilities which it affords. Usually this demonstration work should not be done by a service man, but should be handled by an experienced demonstrator, preferably a woman, who has been trained in the best methods of washing and who has a thorough understanding of the Bendix Home Laundry. By helping the new owner do a complete washing, and more if necessary, a complete check on the operation of the unit can be provided before it is turned over to the customer. If a special demonstrator is not available the person who sold the unit should handle the educational work.

In every instance of instruction to the owner, the demonstrator should be thoroughly familiar with each phase of washing procedure as outlined in Section VII of this book. Lacking intelligent guidance, the owner will frequently experience negative washing results, and mistakenly hold the unit, rather than her procedure, at fault. This point cannot be emphasized too strongly for all connected in Bendix Home Laundry sale and service functions.

THE POST-INSTALLATION CHECK-UP

Approximately two weeks after the Bendix Home Laundry has been installed and the owner thoroughly educated in the use of unit, a call-back should be made, preferably by the demonstrator or salesman who made the original sale, to make sure the new Bendix owner fully understands the operation of the unit and to make sure that the unit is giving a perfect account of itself in every respect.

It should be explained that the call is made to find out if there are any questions that have come up about the operation of the unit, and to be sure that everything is understood perfectly. It is advisable to have the owner operate the unit so as to observe whether it is operating and being operated satisfactorily.

SECTION II

SERVICE CALL TESTING

We are listing in this section of the book some of the problems which might arise were certain parts of the Bendix units to become inoperative. Obviously all service problems cannot be listed, and it is only after having experience in Bendix service that the service man can "shoot trouble" quickly, and reach the right answer the first time.

Every service man should work out his own test routine, and should devise a system of positive checks which will enable him to determine whether or not a part is actually defective before taking the time to replace that part. Nothing identifies an inefficient service man more quickly than the label, "parts changer," denoting a person who changes parts blindly, hoping by the process of elimination to correct the trouble. Such a practice is costly to the consumer, the service man's employer and the factory.

EQUIPMENT REQUIRED

Certain tools are needed to service the Bendix Unit, and a great deal of time will be saved if the service man is provided with these tools. Some are special; that is, they are tools that will do a certain job because they are designed for that particular job only. They are available from the Bendix factory, and cannot be obtained elsewhere. The rest are tools of the type available in any hardware store.

The Bendix factory carries in stock all of the service tools, both special and standard, which are needed for Bendix service. For the convenience of our distributors and dealers we supply three separate kits, Nos. 1, 2, and 3, the difference lying in their completeness and, of course, their price. These kits are listed in Service Bulletins Nos. A-101 and B-102, and we strongly urge every Bendix man to provide himself with one of these kits or its equivalent.

TROUBLE SHOOTING HINTS

(ALL SERIES)

Listed below are problems which might arise due to the failure of a part or parts in the unit to perform respective functions. To issue correction of such failures, the service man should determine which serial number of unit he is servicing, and then refer to the section in this book dealing with that specific series.

CLOTHES BALL UP IN CYLINDER

CYLINDER SPEED SET INCORRECTLY. (Units below Serial No. 145-S-701 Only) Check speed and adjust.

One tool that we urge every Bendix service man to have with him whenever he makes a service call, is a metal clad thermometer, range 0 to 220° F. for testing water temperatures.

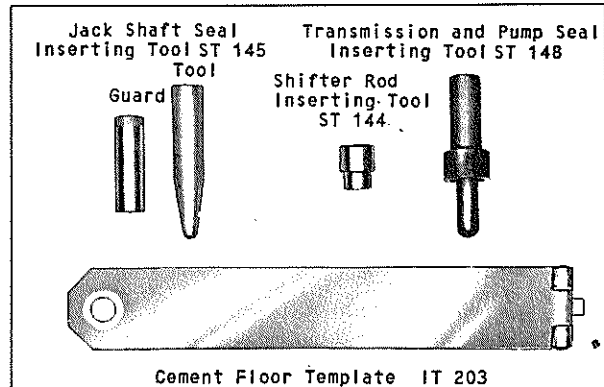


Figure 6

Special Bendix Tools

(Used on Units Above Serial No. 1-B-001)

Correct water temperature has a great bearing on the performance of the Bendix unit, and you cannot diagnose unit performance successfully without a thermometer. Bendix carries such a thermometer under part No. IT202.

Other tools which assist you in testing and diagnosing are speed counter, Part No. IT201, a test light (small light bulb in series with a section of line cord equipped with clips), an ordinary 110 volt line cord with a plug on one end and clips on the other, and an AC volt meter, range 0 to 150 volts.

In servicing the Bendix Unit don't overlook the importance of correct washing instructions to the owner. Experience has shown that many service calls are a result of poor instructions or complete lack of such instructions by the dealer or salesman.

CLOTHES LOADED IMPROPERLY. See Section VII for proper loading procedure.

WATER LEVEL INCORRECT. Check water level with no clothes in cylinder, and reset to proper level.

UNIT NOT LEVEL. If unit is lower in front than in back, clothes will tend to bunch in front of cylinder. Level unit.

CLOTHES NOT DRIED SUFFICIENTLY

CLUTCH PLATES BADLY WORN. Replace plates.

CLUTCH IMPROPERLY ADJUSTED. Re-adjust.

ADJUSTABLE PULLEY IMPROPERLY SET. (Units below Serial No. 145-S-701 Only) Readjust cylinder washing speed to 59 R.P.M.

SHIFTER ARM BELL CRANK SPRING WEAK OR BROKEN. Replace shifter arm. Also check causes under "Will Not Go Into Extraction."

CYLINDER RUNS TOO FAST

CLUTCH PLATES BADLY SCORED. Replace clutch plates.

CLUTCH RELEASE SPRING BROKEN. Replace spring.

TRANSMISSION OIL LOW, WRONG GRADE OR VERY DIRTY. Drain oil, flush transmission with distillate and refill with new Bendix transmission oil.

SHIFTER ARM IMPROPERLY ADJUSTED. Readjust.

SPLINED SLEEVE BINDING IN HIGH SPEED GEAR. High speed gear must be free running fit on splined sleeve; excessive friction between these parts will prevent transmission from slowing down to washing speed. Remove splined sleeve, clean, and polish with fine lapping paper, and remove burrs from inside of gear. If parts are badly scored, replace.

FLOODS—UNIT OVER-FILLS

INLET VALVE STUCK OPEN OR LEAKING. Inspect valve for cracked seats or foreign matter. Replace defective parts. Make sure screens are used in hoses. Check to be sure inlet valve cover nut has not been turned down too tight, thus collapsing casting and causing lower plunger to bind.

FLOAT SWITCH DEFECTIVE. Check switch to make sure that it is breaking contact at the proper time. Replace if necessary.

FLOAT STUCK IN CHAMBER. Check parts and clean.

FLOAT FILLER TUBE IMPROPERLY ADJUSTED. If water stream is directed against float, operation will be erratic. Readjust. (Unit above Serial 72-B-001 Only)

INLET VALVES CHATTERING. Under certain pressure conditions, the use of too short a hose between the inlet valve and the spray tube will cause valve plungers to "dance," thus letting intermittent spurts of water enter unit when valve is supposed to be closed. Increase length of inlet-valve-to-spray-tube hose to at least eight inches. (Units above 72-B-001)

FUSES—HOUSE WIRING BLOWN

FUSES TOO SMALL. Install larger fuses if regulations permit, or preferably, install Fuse-trons of same rating as largest permissible fuses. Fuse-trons will protect house wiring, but will not blow with momentary overloads.

ELECTRIC LINE OVER-LOADED. If unit is connected to circuit which is already loaded to nearly its maximum capacity, fuses may blow as unit starts into extraction. Connect unit to more lightly loaded circuit.

MOTOR DEFECTIVE. Check for grounds or shorts with trouble light. Run motor with belt removed. If motor is defective send to motor repair station or replacement depot.

UNIT OVER-LOADED. Extreme over-loading might cause fuses to blow at start of extraction. Load should be 9 pounds of dry clothes.

WIRING HARNESS DEFECTIVE. Grounded wiring could cause fuses to blow. Check with trouble light.

MOTOR WILL NOT START

FUSE IS BLOWN OUT. See above.

MOTOR DEFECTIVE. Check with belt removed and with trouble light.

TIME CONTROL DEFECTIVE. Motor contact in timer burned. Replace contact block.

WIRING HARNESS DEFECTIVE. Motor leads in harness broken. Check with trouble light. One wire in motor circuit may have loose tip, or tip may not be making good contact in connector. Check voltage at motor terminals with voltmeter. For satisfactory operation, voltage must be not lower than 100 volts.

MOTOR RUNS; CYLINDER DOES NOT TURN

TRANSMISSION PULLEY LOOSE ON SHAFT. Tighten pulley set screw.

MOTOR HOLD DOWN BOLT NOT REMOVED. Shipping bolt and sleeve will hold motor up so that it does not apply tension to belt. Remove bolt and sleeve. (Units above 72-B-001)

BROKEN OR BADLY WORN RETARDER SPRING—LOW GEAR CLUTCH. If spring does not provide sufficient drag to operate low gear clutch, clutch will not engage, thus allowing low gear to run free on jack shaft. Replace spring.

LOW SPEED CLUTCH BINDING. Low speed clutch nut must move freely on clutch screw. If not free it will not engage drive gear. Disassemble transmission, check parts, and clean.

NOISY POWER UNIT

GEARS DEFECTIVE—TRANSMISSION. Badly worn gears due to lack of oil will cause excessive gear noise. Replace gears in sets. Add proper charge (5 oz.) of oil, first flushing transmission housing with distillate.

DEFECTIVE JACK SHAFT BEARING OR BADLY WORN BUSHINGS IN HOUSING. Check bearings and replace.

BUSHING LOOSE—REAR MOTOR SUPPORT. Check bushing and replace if necessary. Install rubber bushing, Part No. 10850 and speed nut, Part No. 10844, on hanger rod.

PUMP SEAL SQUEAKS

SEAL SURFACE GLAZED. A unit which is allowed to run dry for demonstration purposes or in cases where drain hose runs straight down so no water stays in pump may produce a seal which has a glazed surface that emits squeaks intermittently. Squeak may disappear after a few operations with soap and water; however, if it persists replace seal. Inspect thrust washer and impeller, and replace impeller assembly if necessary. If pump is to run dry for any length of time, pack seal with pump grease. It is good practice also to do this when installing new seal to lubricate seal face during run-in period. (Units above 72-B-001)

SPRAY RINSES—MISSING

DRAIN SCREEN CLOGGED. Plugged drain screen will cause slow draining so that there is no time for spray rinse. Instruct owner to clean screen frequently.

DRAIN HOSE TOO LONG. Using extended drain hose will increase draining time of unit, thus shortening or completely eliminating spray rinse. Provide draining facility so that outlet is not over six feet from unit in any direction.

DRAIN HOSE PLUGGED OR KINKED. Effect will be same as above. Remove restriction.

FLOAT TUBE PLUGGED OR FLOAT STICKING IN CHAMBER. If float cannot drop as water level falls in tub, spray rinses will be missed. Check parts and clean.

TOP FLOAT CLIP TOO HIGH. If float bottoms in chamber before clip contacts float switch arm, switch will remain open. Adjust clip.

UNIT DOES NOT DRAIN. Any cause such as defective drain solenoid, plugged drain valve, etc. which prevents unit from draining will cause unit to skip spray rinses as well as causing incorrect functioning in other parts of cycle.

SPRAY WEAK

LOWER PLUNGER IN INLET VALVE STICKING. If upper plunger raises but lower plunger sticks down, water entering unit will be

only that small amount flowing through hole in lower plunger. Disassemble valve and clean. Also make sure hole through lower plunger is not restricted by dirt or faulty seat in top. If so plunger will not rise. (Units above 32,000)

ONE SHUT-OFF VALVE NOT OPENED. Weak spray in soak and last two rinse periods or in wash period with selector switch set for "Warm" could indicate that one shut-off valve is closed. Open valve.

PARTIALLY RESTRICTED INLET WATER LINE. See "Water Does Not Enter Tub."

WATER PRESSURE LOW. See "Will Not Wash Clean."

TIMER WILL NOT ADVANCE AUTOMATICALLY

DEFECTIVE TIMER MOTOR. Replace.

TIMER SHAFT BINDING IN CASE OR KNOB BINDING IN ESCUTCHEON. Remove cam assembly, clean shaft and bearing. Align timer bracket so knob is centered.

TUB FILLS WHEN UNIT IS NOT IN USE

INLET VALVES LEAKING. Replace seats. Instruct owner to close shut-off valves between washings. Also check point on upper plunger to make sure it does not have flaws which prevent it from sealing.

TUB WILL NOT FILL

FOREIGN MATTER UNDER DRAIN VALVE PLUNGER. If plunger cannot seat, pump will remove water from tub as fast as it enters, preventing unit from filling. Disassemble drain valve, clean and replace.

DRAIN SCREEN REVERSED. See "Will Not Wash Clean." Also check causes under "Water Does Not Enter Tub."

UNIT LEAKS OIL

DEFECTIVE TRANSMISSION COVER GASKET. Check gasket and replace.

DEFECTIVE JACK SHAFT OR MOTOR SHAFT SEAL, OR DEFECTIVE SHIFTER ROD SEAL. Inspect parts and replace if necessary. Check Welch plug and gasket, as oil may leak at that point if plug is not properly inserted.

EXCESSIVE CHARGE OF OIL IN TRANSMISSION. Do not add oil above level hole in transmission cover plate. Five ounces is the correct charge.

UNIT NOISY

BELT TOO LONG OR UNEVEN. Belt which is too long will allow drain hose to touch base of unit. Replace belt. Prevent oil from coming into contact with belt as it rots rubber and will cause swelled spots.

TUB BACK BEARINGS DEFECTIVE. Remove belt and rotate cylinder by hand. If loud grating noise is heard, bearings are defective and should be replaced.

CYLINDER SHAFT NUT NOT TIGHTENED SUFFICIENTLY. Flatten out locking washer, tighten nut, and relock.

UNIT ANCHORAGE LOOSE. Inspect anchorage and leveling spacers. One corner of unit may be pounding floor in extraction. Loosen mounting bolts, relevel and tighten.

NUT, BOLT OR SIMILAR OBJECT LYING LOOSE IN BASE OF UNIT.

WATER DOES NOT ENTER TUB

CLOGGED STRAINER IN INLET HOSE. Large amounts of foreign material in pipes may clog strainer, completely shutting off flow of water. Clean strainers.

FLOAT STICKING IN CHAMBER OR FLOAT SWITCH DEFECTIVE. Any cause which prevents float switch from making contact will prevent water from entering tub at proper time. Check parts, clean or replace. See also "Will Not Wash Clean."

INLET VALVE STUCK CLOSED. Disassemble, clean and reassemble.

INLET VALVE COIL OPEN. Check coil and replace.

TIME CONTROL DEFECTIVE. Defective contacts in timer creating open circuit to inlet coils can cause this complaint. Check contacts.

DEFECTIVE SELECTOR SWITCH. If switch does not make contact, it can prevent water from entering unit during wash period only. If water enters during soak and last two rinse periods, trouble is probably in selector switch.

WIRING HARNESS DEFECTIVE. Open circuit in inlet water wiring will cause inlet valve to remain closed. Check harness with trouble light.

FLOAT SWITCH UPSIDE DOWN. Check to make sure switch breaks circuit in raised position and closes it in lowered position.

WATER DOES NOT DRAIN FROM TUB

CLOGGED DRAIN SCREEN. Remove screen and clean. On wood floor installations if water is still in tub it will be necessary to provide receptacle to catch water when drain case is removed. Instruct owner to clean screen frequently.

DRAIN HOSE RESTRICTED OR KINKED. Remove restriction.

DRAIN SOLENOID DEFECTIVE. To test, remove unit front panel, turn timer to end of soak, wash or rinse period, and place trouble light across terminals of solenoid. If light lights but solenoid does not operate, replace solenoid.

DRAIN VALVE PLUGGED. See "Spray Rinses—Missing."

WIRING HARNESS OR TIME CONTROL DEFECTIVE. Make sure drain solenoid is being energized at proper time. If not, check circuit with trouble light and replace open wiring or defective timer contacts.

WATER LEAKS ON FLOOR

CLOTHES DOOR GASKET NOT SEALING. Check gasket and adjust or replace. Check screw in clothes door handle cam. Tighten if loose. Also check glass gasket.

DRAIN CASE GASKET LEAKING. Make sure gasket fits tightly on drain case and make sure that thickest side of gasket is between drain case and tub. Look for cracks or breaks in gasket. Make sure toggle is exerting sufficient pressure on gasket. Adjust if necessary.

HOSE CONNECTIONS LOOSE. This could apply to inlet hoses, spray tube hose, tub-to-pump-hose, float tube, or drain hose. Check connections and tighten.

SOAP DOOR GASKET NOT IN PLACE (DELUXE UNIT). If soap door gasket is not in place, water may splash out soap door opening and run down tub.

TUB BACK GASKET LEAKING. Check gasket and relocate.

PUMP SEAL OR PUMP COVER GASKET DEFECTIVE. Inspect parts and replace if necessary.

TUB BACK SEAL DEFECTIVE. Only small amount of water will escape this way. Will come from hole at bottom of tub back indicating that water is passing seal and running out of hub. Remove tub back and replace seal.

UNIT OVER-LOADED WITH SOAP, OR CUSTOMER USING LARGE AMOUNTS OF SOAP SUBSTITUTES. If suds in tub is so heavy that it still remains at beginning of extraction period, some suds may be forced out air vent in soap door. Instruct owner on using soap.

UNIT OVER-FILLING. See "Floods."

WATER NOT HOT ENOUGH

TEMPERATURE IN SUPPLY TANK TOO LOW. Tank temperature should be 160° if possible, never lower than 140°. Note size of heater. Initial supply of water may be hot enough, but recovery is poor.

COLD WATER MIXING WITH HOT AT MIXING VALVE. A large differential of pressures with the hot much lower than the cold due to restricted water pipe or heater may be causing pressure on cold side to force cold water into hot water line through mixing valve. Pressure differential must be corrected; have owner consult plumber.

WIRES REVERSED AT SELECTOR SWITCH OR INLET VALVE COIL. Check wiring carefully, as you may have switch connected to deliver temperature in wash period opposite that which is indicated by selector knob.

**WATER TOO HOT OR TOO COOL
(ON "WARM" SETTING)**

MIXING VALVE OR THERMOSTAT IMPROPERLY ADJUSTED. Readjust.

INLET HOSES REVERSED AT FAUCETS OR MIXING VALVE. Make sure hoses are connected according to marking on valve.

FOREIGN MATTER IN MIXING VALVE. Dirt may be causing mixing valve head to stick. Disassemble valve and clean. Use fine mesh screens, Part No. 10840, in inlet hoses.

WIRES REVERSED AT SELECTOR SWITCH OR INLET VALVE COILS. Check wiring; rewire according to wiring diagram and marking on selector switch.

WILL NOT WASH CLEAN

CYLINDER SPEED SET INCORRECTLY. (Units below Serial No. 145-S-701 Only.) Check speed and reset.

MISSING SPRAY RINSES. See "Spray Rinses Missing."

INCORRECT WASHING PROCEDURE. This applies to all factors of the unit's operation outside the mechanical functioning of the unit itself.

WATER PRESSURE TOO LOW. Inefficient spray rinses will result if there is not enough volume of water to flush soap from

clothes. Minimum pressure recommended is 20 pounds (Operating), and preferably 40-60 pounds. If pressure is low, consult customer about having system corrected.

WATER LEVEL SET INCORRECTLY. Reset level.

DRAIN SCREEN REVERSED. If drain screen is reversed, float filler tube will fill float faster than tub, thus shutting off flow of water to same. Instruct owner on proper insertion of drain screen and install speed nut, Part No. 10917 on float tube, first adjusting float tube so that at least one inch projects into sump. (Units above 72-B-001 Only)

EXTRACTION SPEED NOT HIGH ENOUGH. See "Clothes Not Dried Sufficiently."

UNIT NOT LEVEL—FRONT TO BACK. See "Clothes Ball up in Cylinder."

WILL NOT GO INTO EXTRACTION

WATER NOT DRAINING FROM UNIT. See "Water Does Not Drain From Tub."

FLOAT STICKING IN FLOAT CHAMBER OR IMPROPERLY SET. Remove parts and clean. Reset top clip.

FLOAT SWITCH DEFECTIVE. Check switch with trouble light and replace if defective.

SHIFTER SOLENOID DEFECTIVE. Make sure solenoid is being energized by turning timer to "Dry" position, and placing trouble light across shifter solenoid terminals. If light lights, but solenoid does not operate, replace.

CLUTCH IMPROPERLY ADJUSTED. If solenoid armature bottoms before sufficient pressure is applied to clutch plates, cylinder will not come up to extraction speed. Check adjustment. If clutch plates are worn so that no adjustment is left, clutch cannot pick up load. Replace clutch plates.

WIRING HARNESS OR TIMER DEFECTIVE. With trouble light make sure current is being delivered to solenoid by timer. If not replace defective wiring or timer contact block.

SECTION III

Units Above Serial No. 72-B-001

*Model B—Deluxe Automatic
Serial No. 74-B-401 and Above*

*Model S—Standard Automatic
Serial No. 74-S-307 and Above*

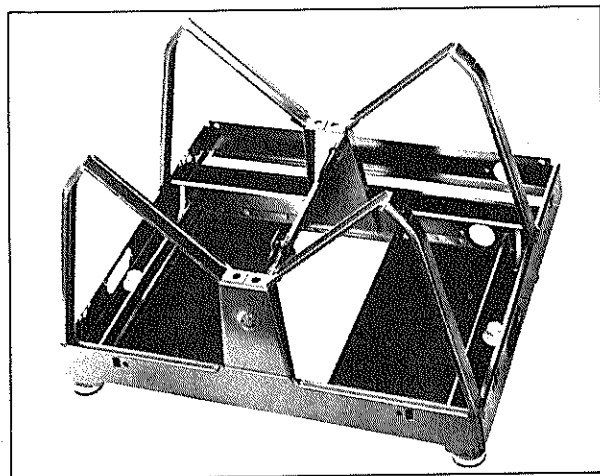


Figure 1
Base Assembly

The base assembly is the frame which supports all the operating units of the Bendix Home Laundry, and it also incorporates the means by which the unit is anchored to the floor.

SERVICE INSTRUCTIONS

To replace a complete base assembly it is necessary to remove the cabinet panels, the tub assembly, and the motor and transmission assembly. See the service instructions for these parts.

TO REMOVE SPEED NUTS:

1. With a small screw driver or drift pin push speed nut toward slot as far as it will go.
2. Insert screw driver between the two halves of the nut and pry outward. It will slide easily out of the slot.

TO INSTALL SPEED NUTS:

1. Insert end of speed nut in the slot with curved lip to the inside.
2. Push into place with screw driver.

CABINET ASSEMBLY

*Model B Deluxe Automatic
Serial No. 95-B-923 and Above*

The Deluxe Automatic Unit is enclosed in a three piece cabinet assembly which is designed to give the unit an attractive appearance and to protect the user from contact with moving parts.

The side and front panels of the cabinet are bonderized and finished in Dulux enamel. The top panel is porcelain enameled. Insulating material is provided inside the side and front panels for sound proofing purposes. An enameled back panel encloses the back of the unit.

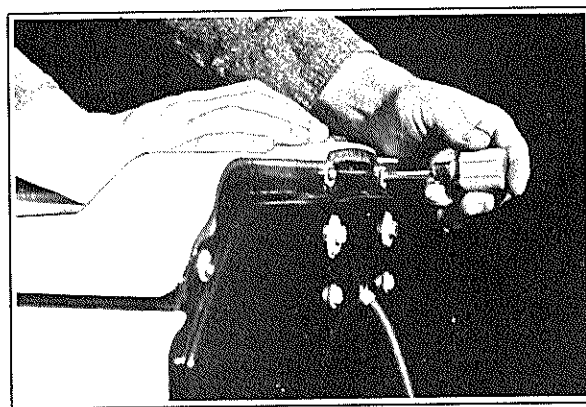


Figure 2
Removing Top Panel Mounting Screws

SERVICE INSTRUCTIONS

TO REMOVE TOP PANEL:

1. Remove four screws that fasten top to back panel.
2. Slide panel forward until selector switch lever will just clear opening in panel.
3. Lift panel straight up and remove.

TO INSTALL TOP PANEL:

1. Set panel in place with front edge of opening just ahead of selector switch operating lever.
2. Slide panel slowly backward into place guiding selector switch lever through opening.

3. Make sure that front edge of panel has engaged flanges on front panel. Install four screws in back panel.
4. Check alignment of timer knob and selector switch lever in escutcheon. Knob should be in center of opening, and lever should operate without scraping escutcheon. For adjustment instructions see "Time Control Assembly."

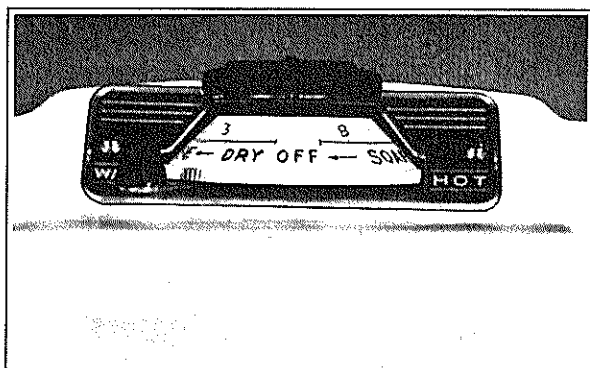


Figure 3
Timer Knob Correctly Located

TO REMOVE SIDE PANELS:

1. Remove top panel.
2. Remove top gasket.
3. Remove screw that fastens front panel to side panel.
4. Remove screws in back.
5. Remove screws at bottom of panel.

TO REMOVE FRONT PANEL:

1. Remove top panel.
2. Remove top gasket.
3. Remove screws that fasten side panels to front panel.
4. Remove screws at bottom of front panel.

TO REMOVE BACK PANEL:

1. Disconnect inlet hoses at mixing valve.
2. Loosen two metal fastening screws at bottom of panel.
3. Remove two machine screws fastening back panel to braces supporting timer mounting bracket.
4. Remove eight metal fastening screws fastening back panel to side panels and top panel.
5. Slide power cord through hole in panel.

When installing back panel, it may be necessary to change the position of the timer bracket braces in order to line up the screw holes with the holes in the panel. In such a case, it will be necessary to readjust the timer mounting bracket to compensate for the change. See P. 44.

*Panels—Model S-Standard Automatic
Serial No. 93-S-601 and above*

On the Standard Unit small panels are used to enclose the working parts of the unit, their shape being designed to conform to the natural contours of the tub assembly so as to produce an attractive unit.

SERVICE INSTRUCTIONS

TO REMOVE FRONT PANEL ASSEMBLY

1. Remove four metal fastening screws.

TO REMOVE DRAIN DOOR ASSEMBLY:

1. Unhook drain door spring.
2. Remove upper and lower hinge pins, or one long pin, depending on type used.

TO REMOVE SIDE PANELS, RIGHT OR LEFT HAND:

1. Remove four metal fastening screws.

In assembling the side panels to the unit, start all four screws, but leave them loose until the panel has been pushed up so as to bring the panel gasket into contact with the tub, then tighten the screws. In assembling the front panel, the same procedure should be followed so as to give proper alignment between the front and side panels, and between the front panel and the tub. The top edge of the front panel should be in contact with the tub with no space showing on either side.

TO REMOVE BACK PANEL:

1. Disconnect inlet hoses at mixing valve.
2. Loosen two metal fastening screws at bottom of panel.
3. Remove metal fastening screws and washers around upper half of panel and remove machine screws and lockwashers that secure panel to guard mounting bracket.
4. Slide power cord through hole in panel.

TO REMOVE REAR GUARD ASSEMBLY AS A UNIT:

1. Remove back panel.
2. Remove timer and selector switch knobs.

3. Remove four screws which fasten timer and selector switch bracket to guards. Entire assembly can be dropped down without disconnecting wiring harness.

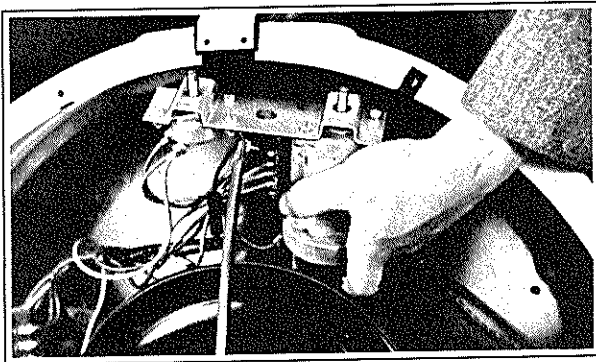


Figure 4
Removing Timer & Selector Switch Assembly

4. Remove metal fastening screws and washers at bottom of guards, and remove screws and washers which fasten guards to brackets under tub mounting bolts.
5. Remove soap door retainer and grill.
6. Remove cap screws that fasten guard mounting bracket to tub.
7. Spread lower ends of guards apart and lift assembly until guard mounting bracket will clear tub back clamp ring.
8. Tilt assembly backward and remove. Remove bracket-to-tub spacer washers.

The individual guard assemblies may now each be removed from the mounting bracket if necessary.

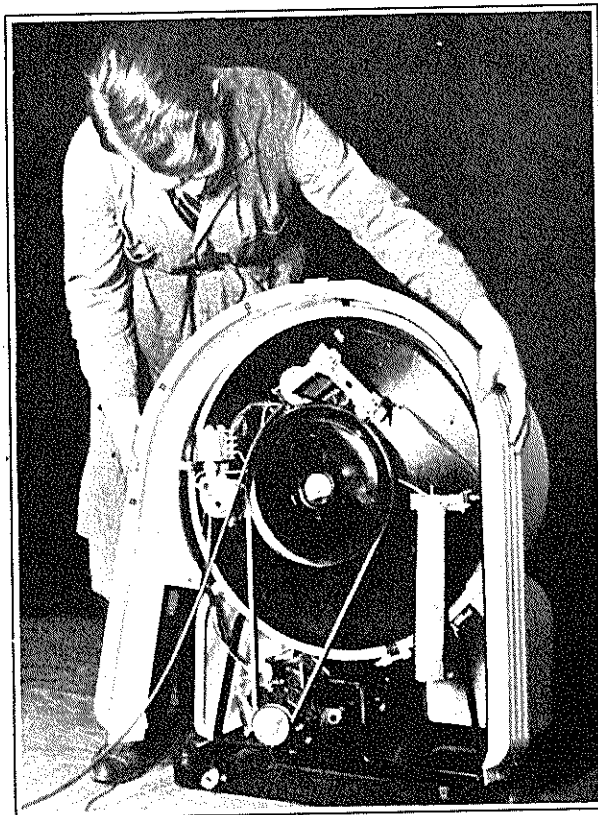


Figure 5
Removing Rear Guard Assembly

CLOTHES DOOR ASSEMBLY

*Model-B-Deluxe Automatic
Serial No. 95-B-923 and Above*

SERVICE INSTRUCTIONS

TO REMOVE DOOR GASKET:

1. Pull gasket from door frame.

TO INSTALL DOOR GASKET:

1. Hold gasket so largest diameter is away from you. It will be noted that the upright sealing flange is not quite in the middle of the gasket; the edge which is farthest from this flange goes over the door frame first.
2. Push gasket into place. If difficulty is experienced moisten the inside of the gasket with soapy water.

NOTE:—The above instructions apply when reinstalling the old gasket on the door. A new gasket, as supplied from the factory does not

present the same appearance as a gasket which has been in use. The gasket is moulded "inside-out" and in being installed, is rolled in place as shown in Fig. 6. This insures uniform tension so that the gasket will grip the door tightly.

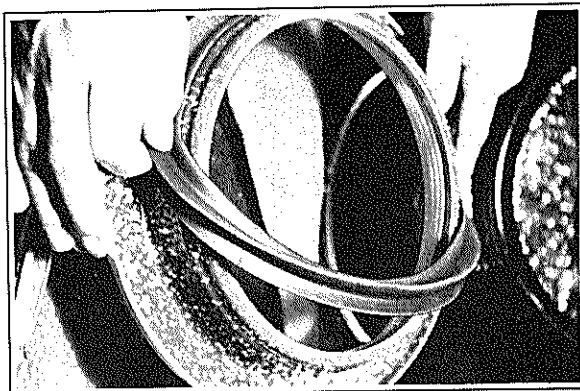


Figure 6
Installing New Clothes Door Gasket

After a new gasket is installed, the door may seem to require too much closing pressure; however, after being used once or twice the gasket will shape itself to the door opening and the door may be closed easily. It is suggested that before attempting to adjust the pressure by adding or removing washers, you allow the gasket to take its set.

TO REMOVE THE DOOR GLASS

(See Note 1 Below):

1. Insert a small screw driver or a punch into the hole formed by the joined ends of the snap ring and pry outward, being careful not to exert pressure against the porcelain enameled door frame.
2. Remove snap ring and lift out glass and glass gasket.
3. Remove glass gasket from glass.

TO INSTALL DOOR GLASS:

1. Install glass gasket on glass. The thickest section is the one which goes on the inside against the door frame.
2. Set glass and gasket in place and insert end of snap ring between rib on door frame and glass gasket.
3. Hold the end already started, and push the ring into place, an inch or so at a time, until you have worked around to the other end. The two ends will now overlap slightly.
4. With a small screw driver or a punch line up the ends of the ring thus exerting pressure on the glass gasket, and the free end will snap into place.

NOTE 1: The above operations can be performed with the clothes door on the unit; however, steps 2, 3, and 4 are simplified if the door frame can be laid flat on a table.

NOTE 2: On Deluxe and Standard units no attention to the placement of the glass in a circular direction is necessary. On Dial-O-Matic units, however, it is important that the water level numbers be located so that the lines are horizontal and the numbers read correctly from the outside.

TO REMOVE DOOR HANDLE:

1. Open door and remove screw in cam.
2. Hold handle with one hand and remove cam with the other.

Installation of the handle is a reversal of the above procedure. Make sure that the cam is turned so that the door will latch with the handle in a straight down position.

TO REMOVE CLOTHES DOOR ASSEMBLY:

1. Remove top panel and cabinet front panel.
2. Remove hinge pin locking screw and washer (Slotted screw at bottom hinge bracket).
3. Remove hinge pin, holding door with other hand.
4. Remove door.

On Standard units, the hinge pin and locking screw are accessible from the outside of the latch cover, and no panels need be removed. Merely follow steps 2, 3, and 4 above.

TO REMOVE LATCH BRACKET:

1. Remove cabinet front panel.
2. Remove screws and spacer washers.

TO INSTALL LATCH BRACKET:

1. Install screws and spacer washers, using a quantity of washers which will give a satisfactory door seal and yet will not necessitate undue pressure for closing the door. Same quantity of washers should be used under each screw. Leave screws loose.

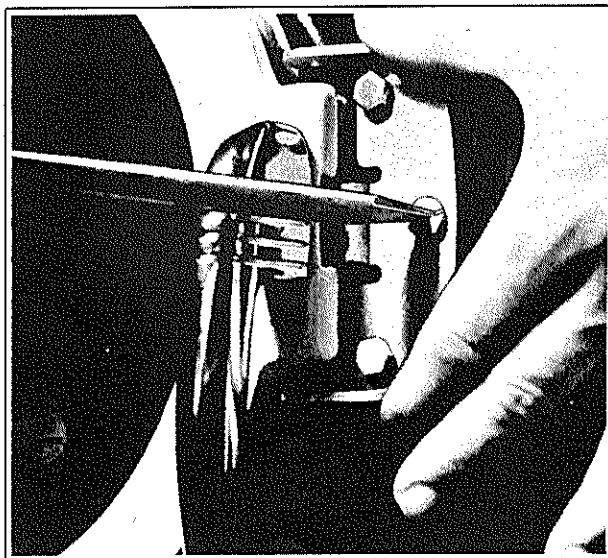


Figure 7
Adjusting Latch Bracket

2. Close and latch door and adjust bracket vertically until door handle stops in straight up and down position when fully latched. See Fig. 7.
3. Tighten screws.

TO REMOVE HINGE BRACKET:

1. Remove cabinet front panel.
2. Remove clothes door.
3. Remove screws and spacer washers.

TO INSTALL HINGE BRACKET:

1. Install screws and spacer washers, using same quantity of washers as is used under latch bracket. Use same quantity of washers under each screw. Leave screws loose.
2. Install door and adjust until gasket is centered in clothes door opening.
3. Tighten screws.

*Model S—Standard Automatic
Serial No. 93-S-601 and Above*

The Standard Model Clothes Door is identical in construction to the Deluxe door and is mounted on the tub in the same way. White enameled covers are used over the latch and hinge brackets.

TO REMOVE LATCH COVER:

1. Remove two lock screws and washers.
2. Unsnap cover from latch bracket. Start open side first and cover will come off easily.

*Model B—Deluxe Automatic
Serial Number 72-B-001 and Above*

Clothes are washed in the Bendix cylinder in the following manner: The cylinder turns in one direction only—clockwise—at a constant speed of 59 R.P.M. As the baffles pass under the garments, they are picked up and carried nearly to the top of the cylinder. There they are thrown toward the other side and downward again to meet the baffles and be carried upward thus following an elliptical path. Meanwhile, the clothes are scrubbing gently against each other and against the baffles, with the result that the meshes of the fabric are thoroughly flexed and opened, no part of the garment being missed. This gives the soapy wash water or the clear rinse water, as the case may be, an opportunity to pass through the fabric again and again, insuring maximum cleansing efficiency.

Clothes are damp dried in the following manner: Each extraction or spin period is preceded by a tumble period of one minute. During this time excess water is allowed to drain from the clothes as they tumble about in the cylinder, fluffing and distributing themselves. At the proper time, the transmission shifts into high speed, and the speed of the cylinder increases until it is turning at 333 R.P.M. The clothes, instead of tumbling off the baffles when they reach the top of the cylinder, continue to revolve with it, being held against the cylinder wall by centrifugal force, and it will be noted that, since the speed of the cylinder was increased gradually, they will automatically have been distributed around the cylinder, so as to give a

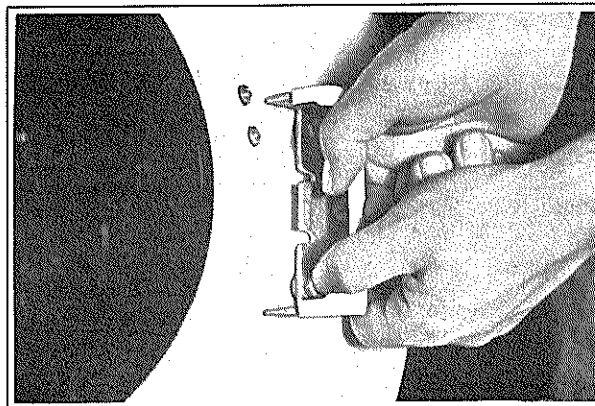


Figure 8
Removing Latch Cover

TO REMOVE HINGE COVER:

1. Remove clothes door (See instructions on Model B door assembly).
2. Remove cover (See step 2 above).

All other service instructions on the Standard Model door are the same as those for the Deluxe Model.

CYLINDER ASSEMBLY

balanced load and produce even drying action. Throughout the extraction period centrifugal force continues to be exerted on the garments, gently pressing out the water, which is thrown through the holes in the cylinder to the tub where it is pumped out. At the end of the spin, the cylinder slows down to a speed of 59 RPM for a period of one minute to give the damp dried clothes a chance to tumble and fluff before being removed from the unit.

SERVICE INSTRUCTIONS**TO REMOVE CYLINDER ASSEMBLY:**

1. Remove cabinet assembly.

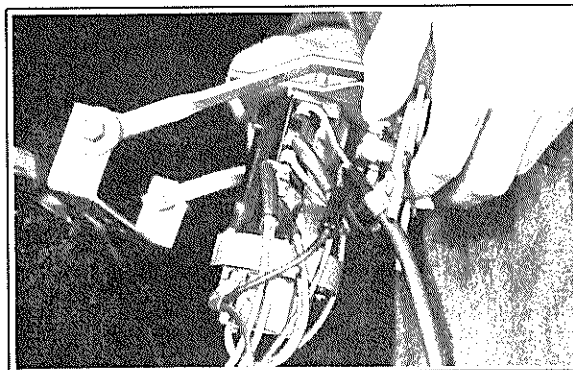


Figure 9
Removing Timer and Selector Switch With
Mounting

- *2. Remove timer and selector switch, with mounting, as a unit by removing bolts that secure mounting bracket to tub. Leave wiring harness connected.
3. Disconnect spray tube hose at spray tube and remove mixing valve with float filler attached. Leave wiring harness attached.
4. Disconnect wiring harness from float switch, snap wiring harness clips out of holes in tub back, and lay timer and selector switch assembly together with mixing valve assembly to one side with harness still connected.
5. Loosen float tube clamp at float and slide down until it clears float chamber. Remove float chamber assembly from tub back.
6. Lay unit on its face. (Provide cushioned support to prevent injury to clothes door and handle.)
7. Remove belt.
8. Remove tub back clamp ring.
9. Remove tub back and cylinder assembly as a unit. If spray tube tends to adhere to grommet, first moisten spray tube with soapy water.



Figure 10
Loosening Tub Back Clamp Ring

10. Remove cylinder pulley and outer spacer.
11. Remove tub back from cylinder.
12. Remove inner spacer and washer.

*Omit step 2 on units with serial numbers between 72-B-001 and 95-B-923. On units below 74-B-401 loosen the rear tub mounting strap before removing the tub back, to prevent collapsing the tub.

TO INSTALL CYLINDER ASSEMBLY:

1. Place zinc washer or washers on shaft next to cylinder.

Note:—The color of paint which is used on the end of the cylinder shaft determines the number of washers, part No. 10372, which should be used to assure correct spacing between the front of the cylinder and the door flange. The correct spacing is $5/16''$ plus or minus $1/16''$. On cylinders with green color coding, use one washer, with blue coding, two washers, and with yellow coding, three washers. If cylinder shaft is not color coded, use only one washer, part No. 98413.

2. Install inner spacer, tapered side away from the cylinder.
3. Install tub back (Porcelain cone to the inside) outer spacer, key, and pulley. Pulley hub goes next to tub back.
4. Install shaft nut and lock in place by bending edge of locking washer down against one face of nut.

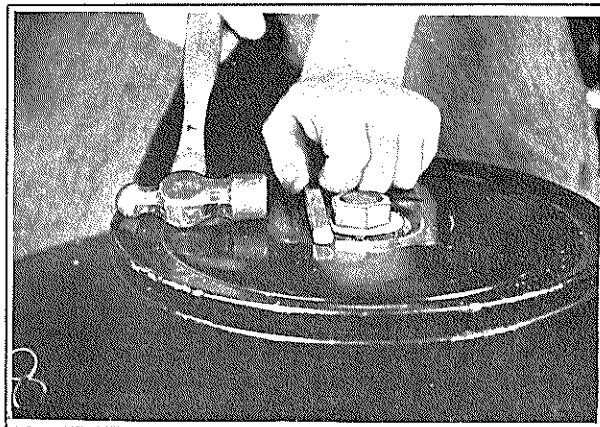


Figure 11
Setting Locking Washer Against Nut

5. Set tub back and cylinder assembly into tub, guiding spray tube through grommet. Line up hole in top edge of tub back with hole in tub flange. Use a punch to keep these holes lined up during remainder of assembly operation.
6. Install tub back gasket. (Edge of bead goes toward back of unit.)
7. Install tub back clamp ring. After tightening screw, tap ring all the way around with a soft hammer and tighten screw again.
8. Set unit in upright position and install belt. Tighten rear tub mounting strap (Units under 74-B-401 Only).
9. Install float assembly.

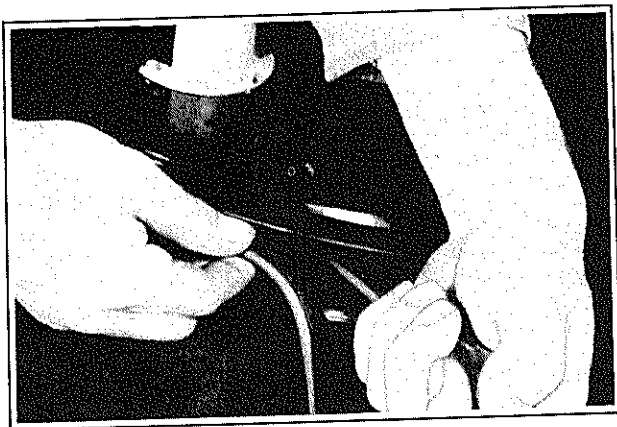


Figure 12
Installing Tub Back Gasket

10. Install timer and selector switch assembly. If position of braces or vertical adjustment has not been disturbed no further location or adjustment should be necessary.
11. Install mixing valve. Connect wiring harness to float switch.
12. Install cabinet assembly.

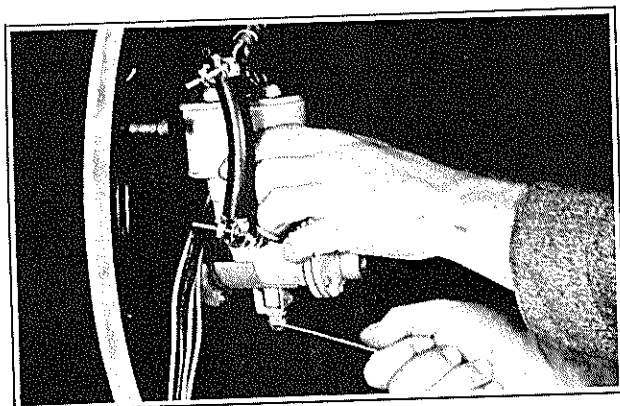


Figure 13
Installing Mixing Valve

TO ADJUST CYLINDER SPEED TO 59 RPM: (Units Below Serial No. 145-S-701 Only)

1. Check speed with a revolution counter on cylinder shaft.
2. Remove belt.

IF SPEED IS LOW:

3. Remove outboard half of transmission drive pulley and remove one shim to increase speed one RPM, two shims to increase speed two RPM, etc.

IF SPEED IS HIGH:

3. Remove outboard half of transmission drive pulley, and add one shim to decrease speed one RPM, two shims to decrease speed two RPM, etc.
4. Assemble pulley and install belt.
5. Check speed.

Correct cylinder speed for washing, rinsing, and tumbling, is important to the successful operation of the Bendix Unit. It should be as near 59 RPM as possible under load, never more than 60 RPM, nor less than 58 RPM.

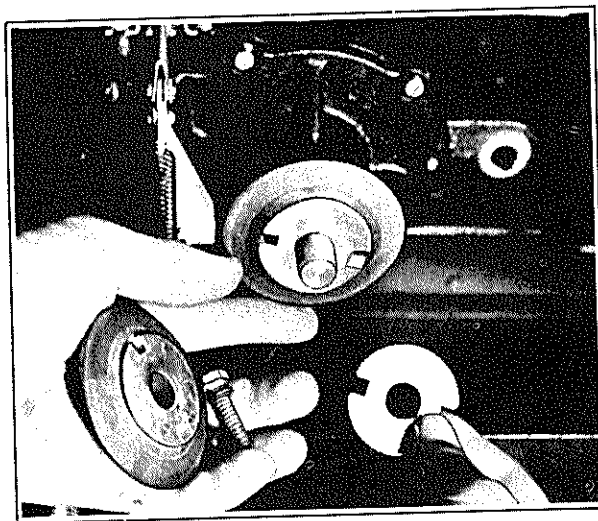


Figure 14
Removing Pulley Shim

*Model S—Standard Automatic
Serial Number 93-S-601 and Above*

The Standard Model cylinder is identical in its construction and operation to the Deluxe cylinder.

FLOAT ASSEMBLY AND FLOAT SWITCH

*Model B—Deluxe Automatic
Serial No. 72-B-001 and Above*

*Model S—Standard Automatic
Serial No. 73-S-451 and Above*

The function of the Float Assembly in the operating cycle of the Bendix unit is the control of the water level in the cylinder. It operates

on the "water finds its own level" principle—that is, the level of the water in the float chamber is always the same as the level of the water in the tub. Due to the turbulence caused by the rotation of the cylinder, a controlling device placed inside the tub would not function satisfactorily, so a remote chamber is provided and is connected to the tub by a pipe. The water rises or falls in this chamber as the tub fills or

drains, and its level is not materially affected by the agitating motion of the cylinder.

The operating device is a set of inverted cups coupled together with a rod and placed so that they will travel upward or downward according to the water level. The floats, which are open at the bottom, obtain their buoyancy from the air which is captured inside them; a tumbler inverted in a pan of water may be used as a quick means of demonstrating this principle. The top float has threaded into it at the center a rod which passes upward through an eye in the arm of the float switch.

The float switch is of the spring toggle type and is fitted with a long arm so that sufficient leverage will be provided to insure positive operation of the switch despite the comparatively small pressure created by the buoyancy of the floats. Two spring clips are provided on the float rod, one located above the switch arm and the other below it; these clips operate the switch.

As the water rises in the float chamber in the filling operation, the float assembly travels upward. The lower clip comes in contact with the switch arm, and as soon as the water has risen

far enough to give the floats sufficient buoyancy to overcome the spring tension, the switch arm snaps upward and the switch breaks the circuit of the inlet valve coils and the shifter solenoid.

In draining, the operation is reversed. As the water level falls, the float assembly travels downward and the top clip comes in contact with the switch arm. As soon as the float has lost enough buoyancy that the weight of the float assembly overcomes the spring tension, the switch arm snaps downward and the switch closes the circuit of the inlet valve coils and the shifter solenoid.

In order for the level of the water in the float chamber to correspond to the level of the water in the cylinder, the air over the surface of the water in both places must be under atmospheric pressure. In filling, the air in the tub is displaced by the incoming water, and in draining air must replace the water as it drains from the tub. Therefore, a vent is provided in the soap door to permit free flow of this air, and it is important that the vent be kept clear at all times; otherwise erratic operation of the float will result.

SERVICE INSTRUCTIONS

TO REMOVE FLOAT SWITCH:

1. Remove top float clip.
2. Disconnect wiring harness from switch and remove switch from bracket.

TO REMOVE FLOAT ASSEMBLY:

1. Lift from float chamber.

TO REMOVE FLOAT TUBE: (Serial Nos. 72-B-001 to 74-S-307)

1. Loosen screw in clamp around float chamber and slide clamp down.

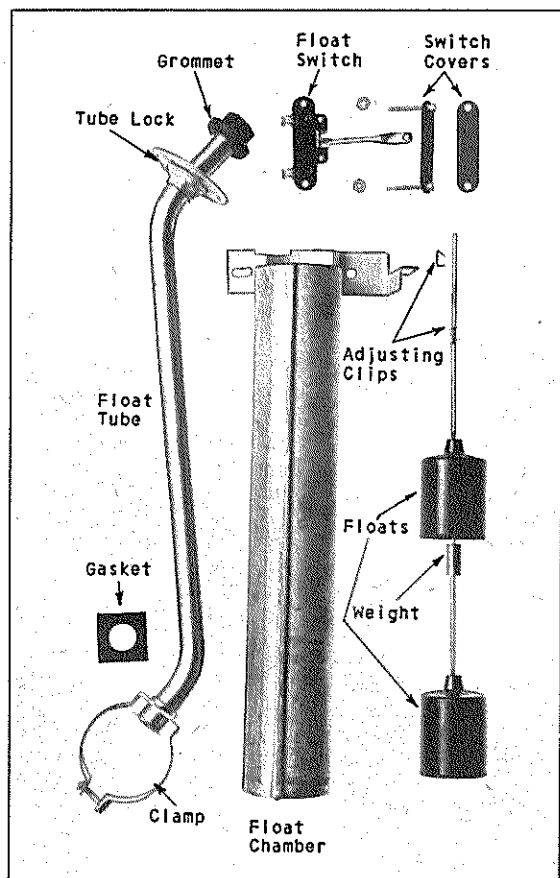


Figure 15
Parts of the Float Assembly

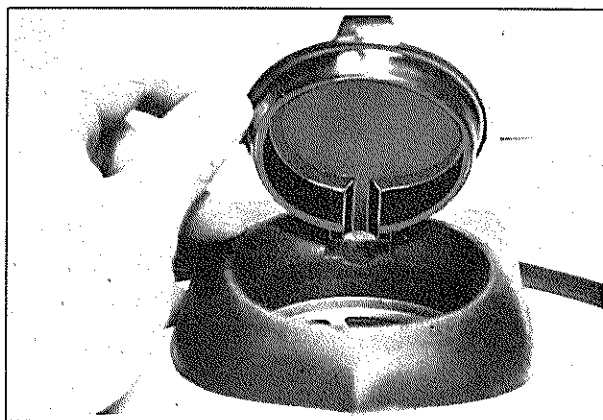


Figure 16
Air Vent in Standard Model Soap Door

2. Loosen clamp on hose which connects float tube to tube in drain sump. Remove float tube.

3. Remove tube-to-float-chamber gasket and slide clamp off unflanged end of tube.

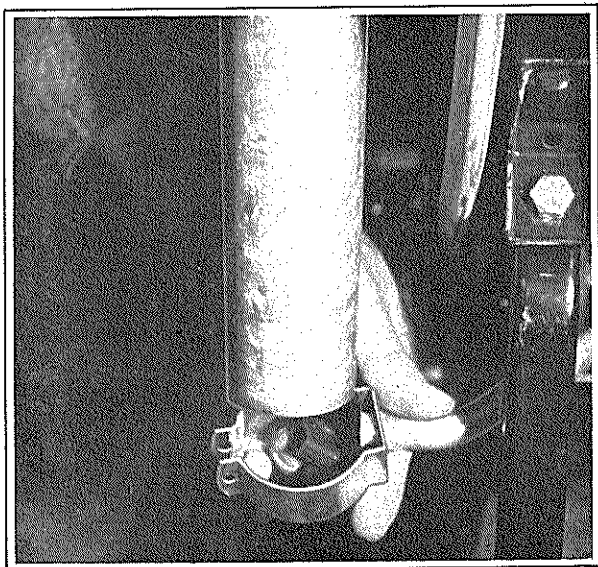


Figure 17
Disconnecting Float Tube at Float Chamber

TO REMOVE FLOAT TUBE:

(Serial numbers above 74-S-307)

1. Loosen screw in clamp around float chamber and slide clamp down.
2. Remove drain screen and case from unit.
3. Turn tube lock on drain sump to the left until slots will clear heads of bayonet pins.
4. After removing tube lock and grommet, remove tube-to-float-chamber gasket and slide clamp off unflanged end of tube.

TO REMOVE FLOAT CHAMBER:

1. Unhook float filler tube spring from float mounting bracket.
2. Remove screws which fasten float bracket to tub back.

TO ADJUST FOR CORRECT WATER LEVEL:

1. Check water level as follows: With no clothes in cylinder, turn time control to beginning of soak period and let unit run until water shuts off. As soon as water stops flowing, pull power plug, open clothes door and note level of water. It should come just to the edge of the door opening, but should not run out when door is opened.

IF WATER LEVEL IS LOW:

2. Move bottom clip on float rod down by an amount equal to the distance between the

level of the water and the edge of the door. Recheck level.

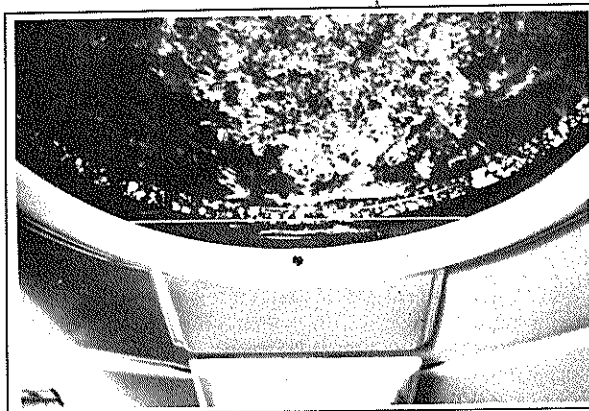


Figure 18
Water Level Correctly Set

IF WATER LEVEL IS HIGH:

2. Move bottom clip up $\frac{1}{4}$ inch and repeat checking operation. Move clip in $\frac{1}{4}$ inch steps until proper level is reached.

TO ADJUST FLOAT TO CLOSE SWITCH AT PROPER TIME:

1. Set top clip on float rod so that with no water in tub and switch closed, float does not quite bottom in float cylinder. When unit is draining the float should close the switch as soon as the water has drained

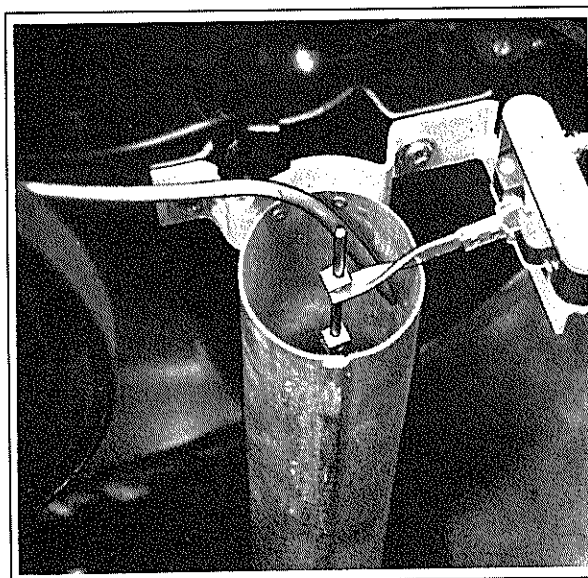


Figure 19
Correct Placement of Float Filler Tube

to a point where it no longer touches the cylinder.

FLOAT FILLER TUBE

While the float filler tube is actually a part of the inlet water system, its function is related so closely to the operation of the float that its description has been included under this section.

The filler tube is connected to the inlet valve at a point just ahead of the connection to the unit spray tube. Thus, part of the water which normally would have entered the tub through the spray tube is diverted into the filler pipe and flows instead into the float chamber. The size of the filler tube is such that the volume of water flowing through it into the float chamber is approximately $\frac{1}{8}$ of the total flow. It is just enough to fill the float chamber slightly faster than it normally would fill from the tub.

During the filling operation there is always a flow of fresh clear water away from the float chamber through the float tube and into the tub. During the draining operation, the flow is again away from the float. Consequently, there is no tendency for undissolved soap, lint, and other foreign matter to be carried into the float tube and the passage is kept clear. This is the only function of the float filler tube; it has no relationship to the operating principle of the float assembly.

In installing or adjusting the filler tube, make sure that the outlet end is set so that the flow of water is directed down along the sides of the chamber and not against the floats.

INLET AND MIXING VALVE ASSEMBLY

*Model B — Deluxe Automatic
Serial Number 72-B-001 and Above*

*Model S — Standard Automatic
Serial Number 73-S-451 and Above*

The inlet and mixing valve assembly comprises, in reality, three separate mechanisms, each of which has a definite function connected with controlling the flow of water into the Bendix Unit.

THE INLET VALVES are illustrated in Fig. 20. One valve controls the flow of lukewarm water for the soak and last two rinses and for the wash period, provided the selector switch is set for "warm." The other valve controls the flow of hot water when hot water is used in the wash and first rinse periods.

A chamber is machined into the cast brass valve body for each inlet valve. The inlet to the chamber is a drilled hole in the side leading from the water source, and the outlet is a passage in the bottom of the chamber, fitted with a rubber seat and entering into the passage which connects to the spray tube and float filler tube. The flow of water through each valve is controlled by a set of two stainless steel plungers, one resting on top of the other as shown, the lower plunger being housed by the chamber in the valve body and the upper plunger by a copper tube which is flat flared at the bottom and sealed to the valve body by a tube nut.

The lower plunger is provided with a small hole in its center which extends from the point at the bottom up through the top where it is fitted with a rubber seat. The point of the upper plunger rests in this seat. A copper washer is held between the valve body and the plunger cover by the tube nut and serves to restrict the movement of the lower plunger.

Electrical control of the valve is provided by a solenoid, or coil, which is fitted down over each copper tube plunger cover and is encased

by a steel cover. The two steel plates that form the top and bottom of the coil pack are fitted with steel sleeves that extend into the coil at each end for a distance of $\frac{1}{2}$ inch to shorten the air-gap through which the magnetic flux must pass and thus to increase the electrical efficiency of the coil. The pack is held in place of a phosphor bronze clip riveted to the cover plate. As the coil assembly is pushed into place, the ends of the clip bear against the tops of the plunger cover and resist, through friction, any tendency for the assembly to jar out of place. Plug-in receptacles are provided for the side of the coil assembly for the electrical connections to the coils.

The mechanical action of the inlet valves is best understood by studying carefully the following cycle of events:

1. As the time control moves forward into the soak, wash, or rinse period, the contact finger makes contact at the proper time and the inlet valve coil is energized.
2. A strong magnetic field is created by the coil and circulates through the coil cover, the steel sleeves, and the upper valve plunger. The plunger, whose static position is below the electrical center of coil, tends to center itself in the field and is thus lifted.
3. This action opens the hole through the lower plunger, and water, which surrounds it, immediately starts to flow downward through this hole. The passage between the walls of the valve chamber and the lower plunger is restricted due to the small clearance between these two surfaces, and the exhausting of water from above the plunger creates a condition whereby the pressure above the plunger is somewhat lower than the pressure below it, with the result that this plunger is lifted.
4. As soon as the tip of the plunger clears the valve seat, water flows through the outlet and into the spray tube. As long as the hole in

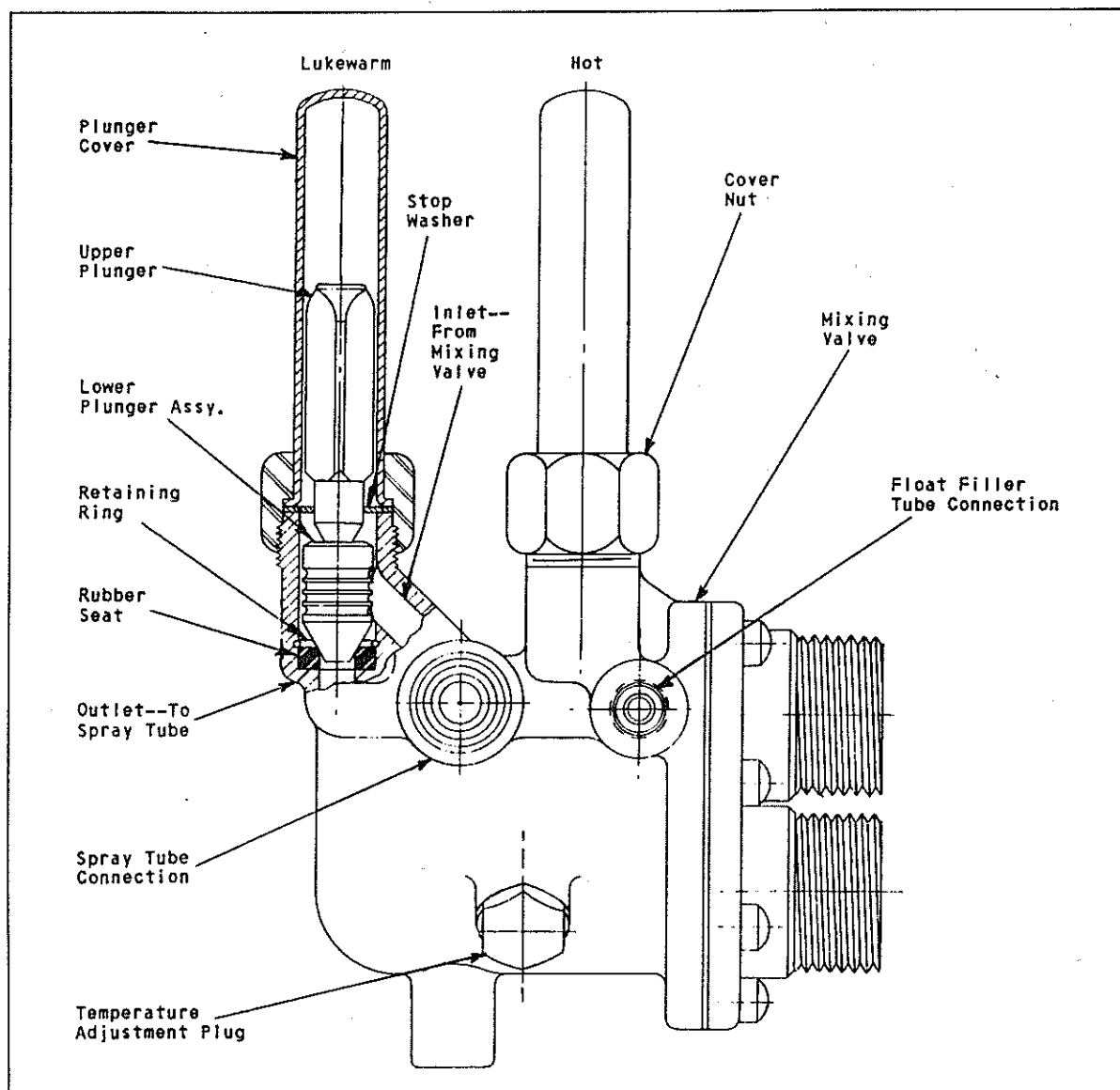


Figure 20
Inlet Valves

the plunger is left open, the pressure below the plunger will exceed the pressure above it, and the valve will remain open.

In closing, the valve action is as follows:

5. When the time control or the float switch breaks the electrical circuit to the inlet valve coil, the coil is no longer energized and the magnetic field collapses. The upper plunger then drops down, closing the hole in the top of the lower plunger.

6. With the hole through the lower plunger closed, the pressure above it exceeds the pressure below it due to the rush of water through the valve seat. This difference in pressure plus the weight of the lower plunger and the weight and

inertia of the upper plunger as it drops into place all combine to seat the lower plunger quickly, thus closing the valve.

THE THERMOSTATIC MIXING VALVE ASSEMBLY is a mechanically operated, dual acting valve, the function of which is to mix the incoming hot and cold water in the proper amounts to maintain a predetermined temperature during the "lukewarm" periods of the cycle.

The mixing valve is housed in the cast brass valve body and is held in place by the valve cover, which also incorporates the threaded openings for the inlet hose fittings. It consists of two basic assemblies, the mixing valve head, and the bi-metal thermostat element. The two

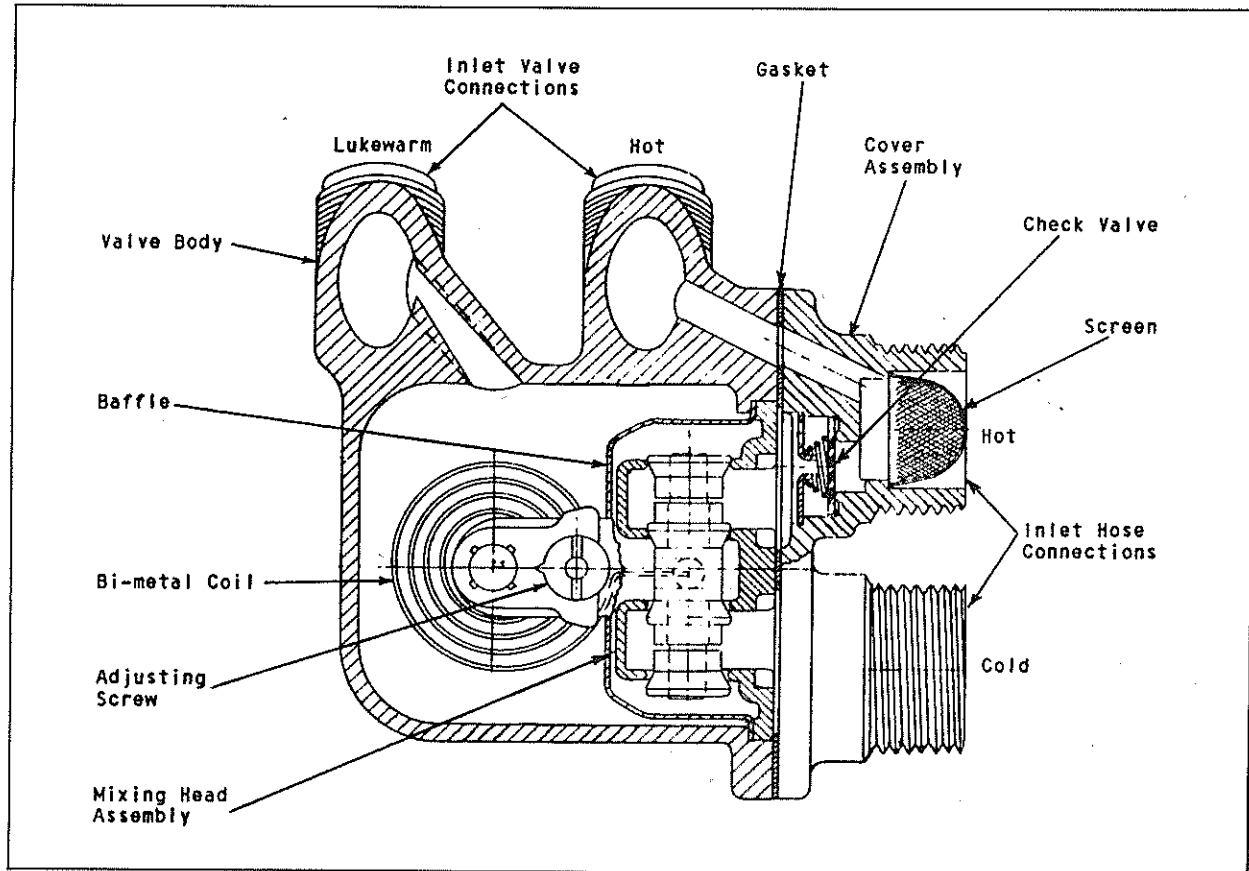


Figure 21
Mixing Valve Assembly

parts are doweled into place in the valve chamber, so that the ball on the end of the bi-metal element fits into the square hole in the middle of the mixing valve plunger, thus giving the mechanical coupling necessary to provide control of the incoming water.

It is obvious that any bimetallic thermostat would not develop sufficient force if it were necessary for it to operate a valve against full line pressure; hence a balanced pressure type of construction has been employed in this valve. Each small chamber of the mixing valve assembly (hot and cold) has an inlet and two outlets or ports; correspondingly, the plunger is fitted with two seats for each side of the valve, or four seats in all.

It will be noted, by studying Fig. 21 closely, that in each chamber one outlet port is machined with its slope toward the inside of the chamber and the other is machined with its slope toward the outside. Thus, the pressure from the inside of the chamber which tends to hold one seat closed is balanced by the same pressure, which on the other side is tending to open the valve, and the plunger assembly is free to move back and forth without resistance due to water pressure.

In each inlet port of the mixing valve cover on units with serial numbers above 147-B-452 a spring-loaded check valve is provided to prevent any back flow of water into the inlet lines and to prevent any mixing of cold water with the hot during the wash period. The construction of these check valves is illustrated in Fig. 21.

The action of the mixing valve in controlling water temperature is as follows: When the inlet valve opens, which controls the entry of lukewarm water into the unit, water flows out of the chamber surrounding the bi-metallic element through the mixed water port, through the inlet valve, and into the spray tube.

Water immediately flows through the mixing valve, into the cup-shaped stamping surrounding it and out of this stamping at the center directly against the bi-metallic element. The amount of hot or cold water flowing at the instant of starting will depend on the position given to the mixing valve plunger by the thermostatic element.

Assuming that the unit has been setting idle long enough for the water in the valve to cool down to room temperature, the bi-metallic element will have contracted enough to move the

plunger completely to its seat on the cold side and to have opened the hot side. Momentarily, then, only hot water will flow. As soon as this hot water strikes the bi-metallic element, it will expand closing the hot valve and opening the cold valve, and as cold water enters the process will be reversed. Thus, an oscillating condition is set up, and alternate pulses of hot and cold water will be metered into the valve chamber to produce mixed water of the proper temperature.

As the water flow continues and the temperature of the water in the supply lines becomes uniform, less and less movement of the plunger is needed to effect control. The valve, therefore, reaches a more or less stabilized position, and although the oscillating action continues to a slight degree, the flow of water from either port is not completely shut off at any time.

When hot water is being used in the wash and first rinse period, the water flows from the hot port directly into the inlet valve and thence into the spray tube. Since the "lukewarm" inlet valve is closed the mixing valve exerts no control over the water temperature during these periods.

SERVICE INSTRUCTIONS

TO REMOVE INLET VALVE COILS:

1. Disconnect wiring harness.
2. Insert a small screw driver under one end of coil retainer spring and pry away from valve cover tube. Work coil pack up slowly, lifting first one side of spring and then the other until coil assembly is free.
3. Remove top and bottom cover plates from coil pack.
4. Remove steel coil wrapper, noting carefully position of terminal strip so that in reassembling, coils will not be reversed or turned over.

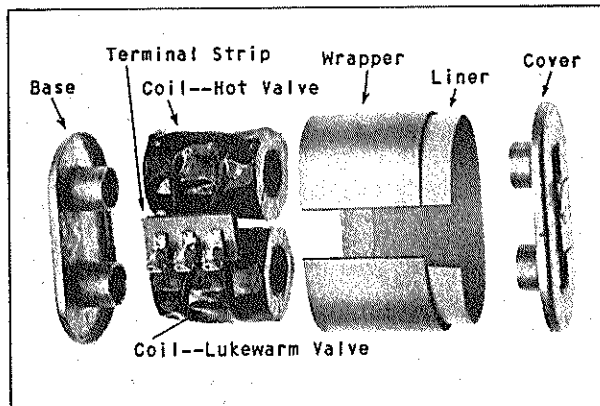


Figure 22
Inlet Valve Coil Assembly — Showing Connections.

TO REMOVE INLET AND MIXING VALVE ASSEMBLY:

1. Remove inlet valve coil assembly.

UNITS 72-B-001 TO 93-S-601:

2. Disconnect spray tube.

UNITS ABOVE 93-S-601:

2. Disconnect float filler tube. Disconnect spray tube hose from fitting. Note: On units with serial numbers between 93-S-601 and 118-S-385 a special spray tube-to-mixing valve fitting was used which also incorporated the connection for the float filler tube. Above serial No. 118-S-385 the float filler tube connected directly to a port in the inlet valve body, and the spray tube connector fitting was changed to a copper tubing elbow which is connected to the outlet port by means of a standard tube nut.

3. Remove screw and clip underneath valve mounting bracket and remove valve assembly.

TO DISASSEMBLE INLET VALVES:

1. Place inlet and mixing valve assembly in

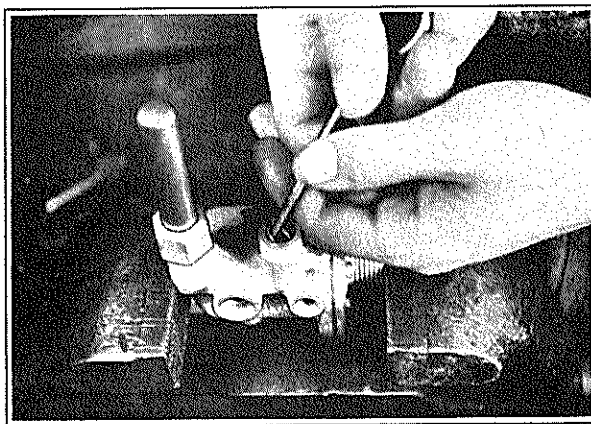


Figure 23
Removing Inlet Valve Seat Retainer Ring.

a vise loosely with one jaw of vise against face of inlet ports in cover.

2. Remove plunger cover nut, plunger cover, upper plunger, stop washer, and lower plunger.
3. Remove valve seat snap ring and valve seat using a hooked tool such as the one illustrated in Fig. 23.

Note: In installing the plunger cover nut, tighten it just enough to seal the cover tube to the valve body. Further tightening may result in deformation of the chamber housing the lower plunger or may strip the threads.

TO REMOVE MIXING VALVE HEAD AND THERMOSTATIC ELEMENT:

1. Remove mixing valve cover. If cover tends to adhere to gasket, several sharp taps on the edge with a soft hammer or screw driver handle will generally loosen it. If not, insert end of screw driver between cover and valve body and turn slightly until cover comes free.
2. Remove gasket.
3. Remove mixing valve head assembly.

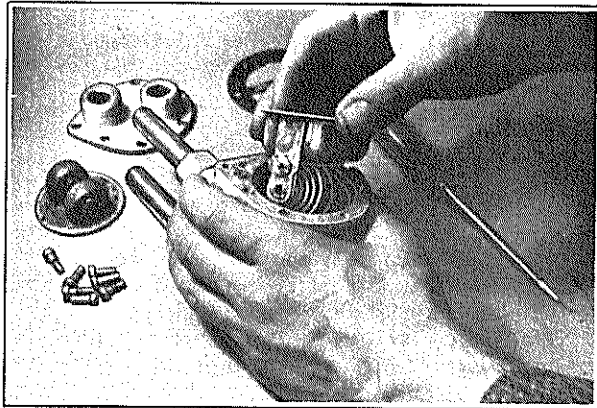


Figure 24
Removing Mixing Valve Coil Assembly

4. Remove thermostatic element.

Do not attempt to disassemble the mixing valve head, thermostatic element, or valve cover. If any of these parts is defective it should be replaced.

TO ADJUST VALVE FOR PROPER TEMPERATURE: (Units above Serial No. 147-B-452 only)

1. Set selector switch to "warm" and turn timer dial to first rinse period. Allow to run until water in hot water line has come up to tank temperature, and then check temperature of water flowing from spray tube by holding bulb of thermometer in spray. Correct temperature is 98-100° F.
2. If adjustment is needed, close both hot and cold shut-off valves and stop unit.

3. Remove plug near bottom of mixing valve body. Insert short screwdriver and turn adjusting screw clockwise to increase temperature, and counter-clockwise to decrease it. Turn very small amount at a time,

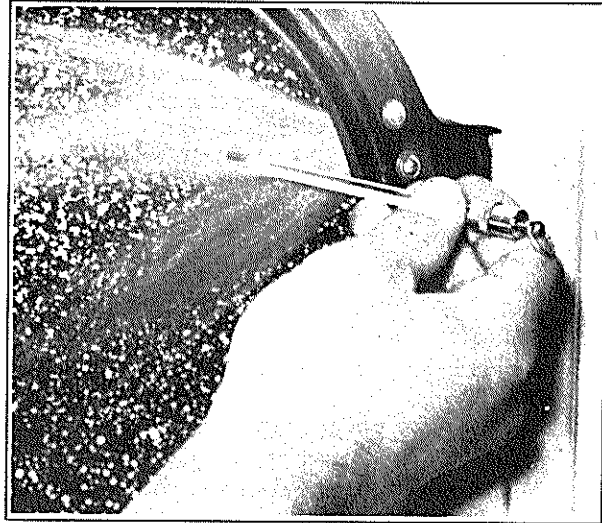


Figure 25
Checking Water Temperature

as adjustment is quite critical, $\frac{1}{8}$ turn giving a temperature change of approximately 10 degrees.

4. Replace plug and gasket and recheck temperature.

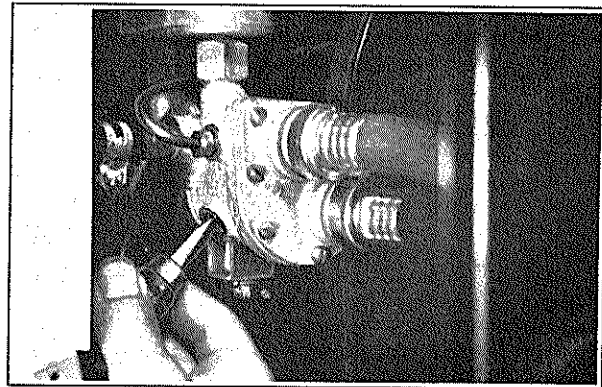


Figure 26
Adjusting Water Temperature

MOTOR, TRANSMISSION AND PUMP ASSEMBLY

In the Bendix Unit, the Motor, which furnishes the power to drive the cylinder, the transmission which provides the proper power and speed relationship to drive the cylinder at a correct speed for the washing and extraction operations, and the pump, which drains the unit, are all built into one assembly, or Power Plant.

The assembly is supported by two mounting arms and the belt. One mounting arm is fastened to the front motor end and is clamped to the motor hanger rod through a rubber bushing. The other arm is part of the transmission housing and is insulated from the hanger rod by a pressed-in wooden bushing. Rigid support is

not provided by these arms; rather, the assembly pivots about the hanger rod, and the additional support is provided by the belt through the transmission drive pulley. This arrangement provides even tension on the belt, preventing slippage and taking up wear.

SERVICE INSTRUCTIONS

All parts of the Power Plant assembly can be serviced without removing the assembly from the unit, with the exception of the Motor, Transmission Housing, and motor shaft seal. Use the following instructions only where it is necessary to remove the complete power unit; for instructions on parts of the pump and the transmission see the pages following.

TO REMOVE MOTOR, TRANSMISSION, AND PUMP ASSEMBLY:

1. Remove back panel and front panel.
 2. Disconnect motor, shifter, and drain solenoid wires by pulling tips out of connectors.
 3. Remove drain hose.
 4. Disconnect ground wires at transmission housing.
 5. Disconnect tub hose at drain valve.
 6. Remove belt.
 7. Loosen cap screw and nut in front motor hanger clamp.
 - * 8. Remove nut from rear end of motor hanger rod.
 9. Slide assembly back until rear motor hanger clears rod.
 10. Remove assembly, either through front or back of base.
- * Units above serial No. 138-5-658 only.

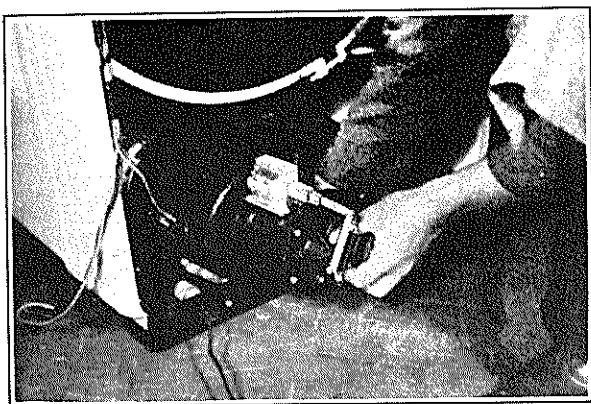


Figure 27

Removing Motor and Transmission Assembly

THE MOTOR in the Bendix power plant is a standard, split phase type, one fourth horse power appliance motor. The stator is of conventional design as is the rotor with the exception of the rotor shaft, which is designed to carry the pump impeller on one end and to drive the transmission on the other.

The rear end bell of the motor is integral with the transmission housing, which also incorporates the rear motor hanger. The motor shaft bearing in this end bell is a bronze bushing and is lubricated by the oil bath in the transmission. The front motor end-bell which is machined to receive the pump housing and the front motor hanger bracket, has a ball bearing of the sealed, self-lubricated type. This bearing is part of the motor and is not carried in stock by the factory as a service part.

The motor is not warranted by Bendix Home Appliances, Inc.; instead, it is warranted by its manufacturer. In case of failure, the motor should be returned to the nearest United Motors Service Station or Branch, or in the case of General Electric motors to the nearest G. E. motor replacement depot.

SERVICE INSTRUCTIONS

Before being sent to the motor manufacturer's service station for repair the complete pump assembly should be removed, and the transmission gears and shifter solenoid should be removed and wrapped for safe keeping. The transmission cover should then be replaced on the empty transmission housing.

THE TRANSMISSION is a device with a function similar to that of the transmission in an automobile in that it provides a means for operating the cylinder at two speeds while the motor runs at one constant speed, 1725 R. P. M. (60 cycle units only). The speed relationship is such that, in low speed, the cylinder is driven at 59 R. P. M. and in high speed at 333 R. P. M.

Unlike an automobile transmission, no shifting of gears is necessary in making speed changes with the Bendix Transmission. This feature is a result of the use of two clutches, one for the high speed gear set and the other for the low speed gear set, making it possible to leave all four gears in constant mesh.

For clarity, the transfer of power through the various parts of the transmission is described below, step by step, and is developed separately for the low speed and high speed operations respectively.

Low Speed: The end of the rotor shaft is milled flat on two sides so that it will fit into the splined sleeve and rotate this sleeve at motor speed. The low speed drive gear also has one end shaped to fit this sleeve, so it too turns at motor speed. The outer end of this gear is supported by a bronze bearing in the transmission cover, which is doweled to the transmission housing for accurate alignment. The low speed driven gear on the jack shaft is in constant mesh with the small drive gear, and is not keyed to the jack shaft; thus, it turns at one constant speed all the time the motor is running.

Mounted next to the low speed driven gear and keyed directly to the jack shaft, is a

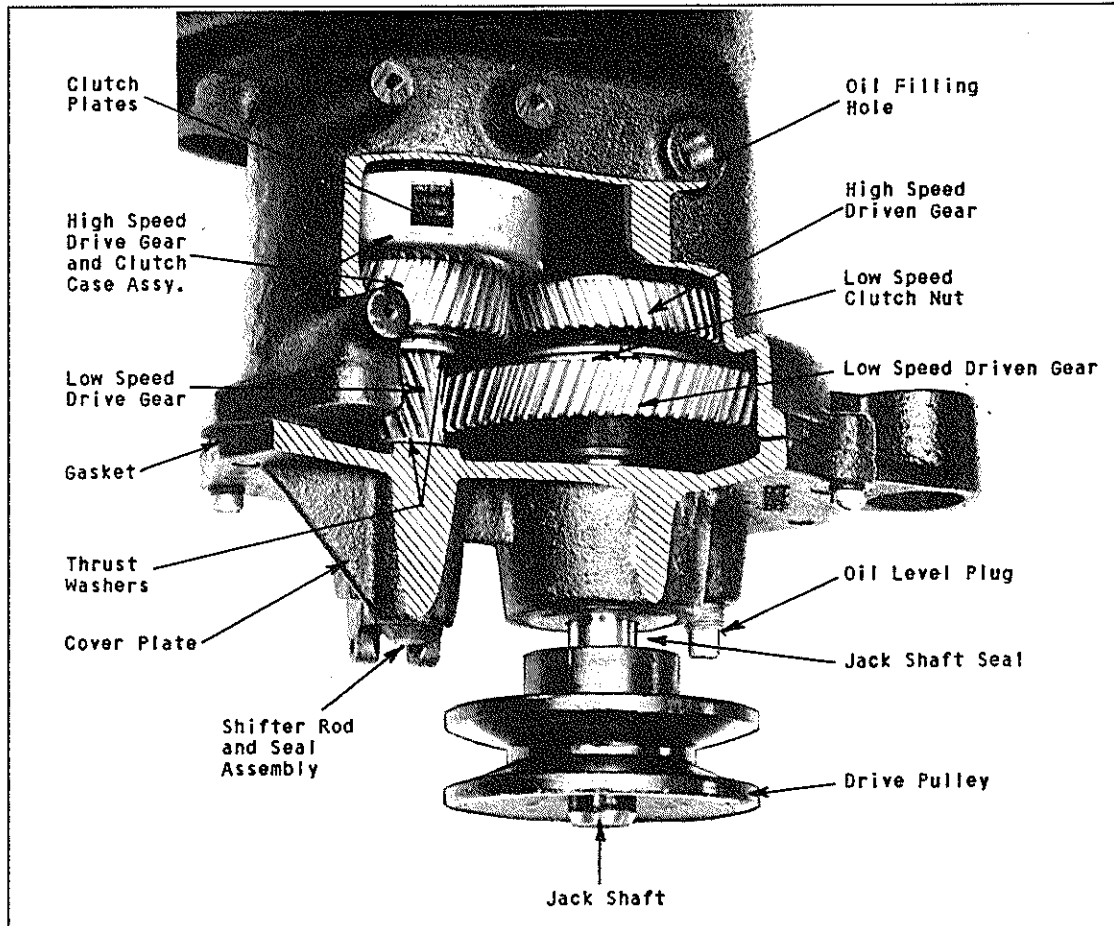


Figure 28
Transmission Assembly
Cut Away View

threaded screw equipped with a flat nut, having teeth shaped to fit similar teeth on the side of the driven gear. Assembled in a groove on the outer edge of the nut is a retarder, or drag, spring with an eyelet in the end which fits around a pin in the side of the driven gear. The action of this spring is such that with the jack shaft stationary, it will, through the rotation imparted by the driven gear, provide a drag on the nut (or clutch) so that the nut will thread itself up against the driven gear, engaging the teeth on the side. With the driven gear and low speed clutch thus locked together, the jack shaft must turn at the same speed as the low speed driven gear.

High Speed: The outer surface of the splined sleeve, mentioned above, is divided into two sections, one smooth to provide a free running fit for the high speed drive gear, and remainder splined to engage the teeth of the driven clutch plates. The high speed clutch consists of alternately stacked driven plates and drive plates with a pressure plate on either end and assembled into the clutch case which is integral with

the high speed drive gear. This latter gear is in constant mesh with the driven gear which is keyed directly to the jack shaft.

Note: — Units with serial numbers below 152-B-680 have a clutch pack consisting of five bronze driven plates and four steel driving plates. On later units, the pack employs a new type driven plate made of an asbestos-fibre compound which tests have shown to have extremely long wearing characteristics. The thickness of the driven plates has been increased and the number of plates has been reduced to three, with a corresponding decrease in the number of driving plates from four to two. The clutch pack using asbestos-fibre plates is interchangeable with the pack using bronze plates provided the COMPLETE SET is interchanged.

The clutch is kept in a released position during low speed operation by a spring between the end of the splined sleeve and the pressure plate. This spring bears directly on the end of the splined sleeve which in turn delivers pressure against the clutch case, thus relieving any pressure on the plates.

When pressure is applied to the shifter rod by the shifter arm, this pressure is transmitted through the shifter ball to the end of the low speed drive gear. This gear acts as a push-rod to apply pressure to the high speed drive gear and clutch case thus compressing the release spring and the clutch plates. As friction between the plates increases, the speed of the driven plates increases thereby increasing the speed of the clutch case and drive gear, the driven gear, jack shaft and transmission pulley.

When the speed of the jack shaft begins to exceed that of the low speed driven gear, this automatically reverses the direction of drag by the retarder spring on the low speed clutch, thus disengaging it from the low speed gear. This leaves the low speed gear free to overrun, and it will continue to do so as long as its speed is less than that of the jack shaft.

The rear jack shaft bearing and the motor shaft bearing are bronze bushings pressed into the transmission housing. A ball bearing supports the front, or pulley end of the jack shaft. Lubrication for these bearings and for the parts of the transmission is provided by an oil bath consisting of five ounces of light bodied oil which circulates constantly when the unit is running.

The oil is sealed into the transmission housing by seals on the motor shaft and the front of the jack shaft. At the rear of the jack shaft a welch plug is used and sealing of the bearing for the low speed drive gear is accomplished by a leather seal assembled into the clutch shifter rod.

A drain plug is provided in the bottom of the transmission housing for draining the oil when necessary, and a filling hole is provided at the top which, in operation, is fitted with a breather pipe. The transmission cover plate is equipped with an oil level hole and plug.

The drive pulley on units with serial numbers below 145-S-701 was made adjustable by means of variable diameter construction. The inboard half of the pulley is separated from the outboard half by thin shims, and the two halves are held together by cap screws. Changing the number of shims changes the effective diameter of the pulley and thus changes the speed of the cylinder. On later units, through maintenance of very close tolerances in belt manufacture it has been made possible to use a one piece pulley. No adjustment is needed on these units.

THE SHIFTER SOLENOID, mounted on top of the transmission housing, is a device for converting electrical energy into the mechanical power needed to operate the clutch. Its construction is similar to that of an iron core transformer with the center leg of the laminated core cut loose so that it is free to slide in an endwise direction. The coil of the solenoid is wound around brass strips which serve as guides for the armature and is wedged tightly into

place to prevent vibration. The coil is thoroughly impregnated against moisture and is connected to plug-in receptacles by means of pig-tail leads.

The clutch shifter arm is a spring loaded leverage which provides the proper ratio of movement and power so that the pull of the shifter solenoid will be sufficient to compress the clutch. It is mounted on a bearing pin on the transmission cover and is fitted with a locked set screw which is in contact with the clutch shifter rod. This screw provides the clearance adjustment for the clutch.

The shifter arm is connected to the shifter solenoid through a bell crank at the top which has its lower arm connected to a spring. The spring is adjusted by means of a screw at the bottom to have a pull of four pounds. The clutch adjusting screw is set so that, as the solenoid armature travels toward its seat, the clutch plates will be completely compressed when the armature still has $3/16$ inches to travel. This remaining three-sixteenths of an inch is taken up by the bell crank spring, and the setting is made in this manner to compensate for wear in the clutch plates; thus, the effective pull on the top of the shifter arm remains constant at four pounds, and since the arm leverage is eight to one, the resultant pressure applied to the clutch plate is 32 pounds.

Transmission Service Instructions TO REPLACE CLUTCH PLATES:

1. Remove belt.

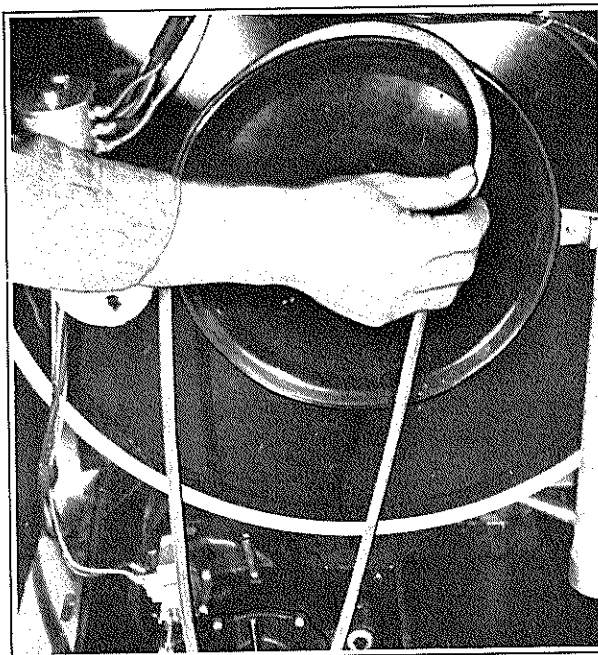


Figure 29
Removing Belt

2. Remove cotter key in pin connecting shifter arm to shifter solenoid linkage and remove pin.
3. Remove screws in transmission cover.
4. Place a pie pan or shallow receptacle under transmission to catch oil.
5. Tap cover with a soft hammer to loosen cover from gasket.
6. Remove cover and jack shaft assembly as a unit. Low gear and clutch assembly will usually come out at the same time. Pressure plate will stay on motor shaft.
7. Remove snap ring holding clutch plates in case and remove plates. Replace with new plates assembled in same order.
8. Check clutch release spring. If worn badly or if it does not have sufficient tension, it should be replaced. Place on shaft with curve toward the outside.

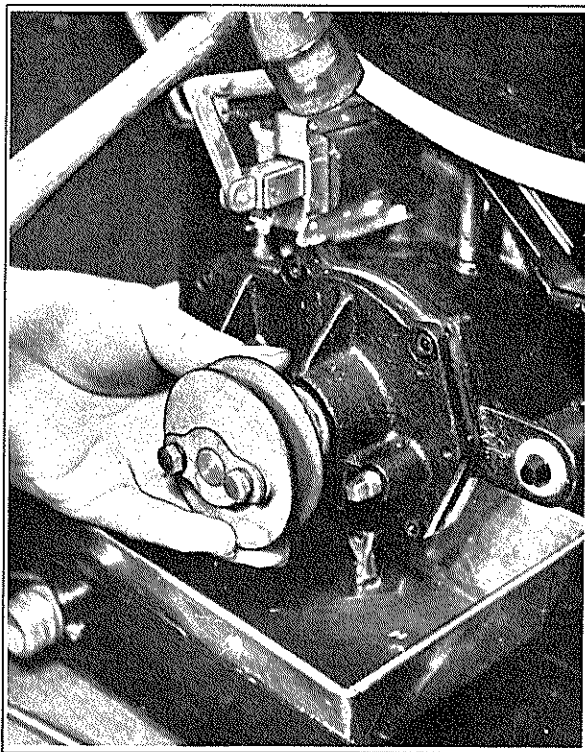


Figure 30
Loosening Transmission Cover and
Draining Oil

9. Put clutch and splined sleeve assembly in place on motor shaft and insert low gear in splined sleeve together with thrust washers.
10. Reassemble transmission, making sure that all parts are assembled in proper order. Inspect gasket before assembling cover plate. If gasket is damaged, use new gasket.

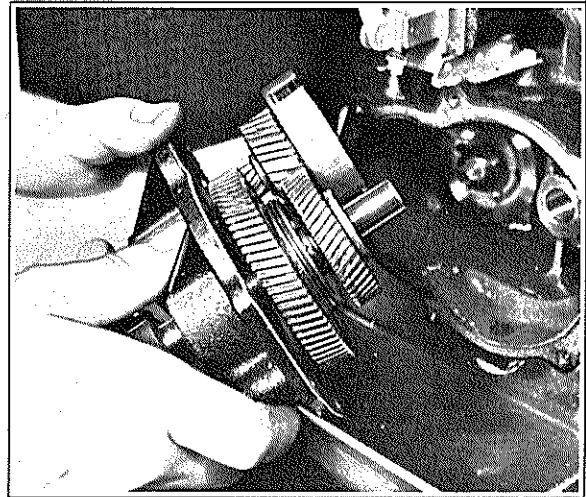


Figure 31
Removing End Plate and Gears

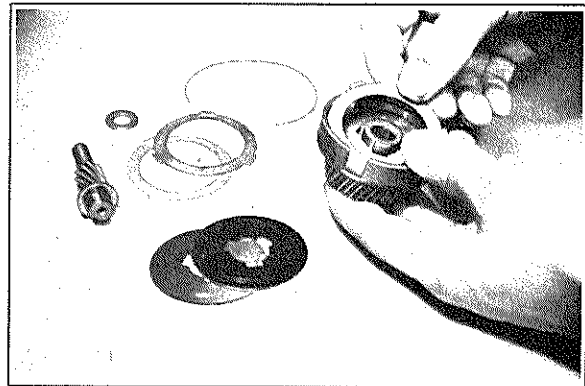


Figure 32
Assembling Clutch Plates into Case

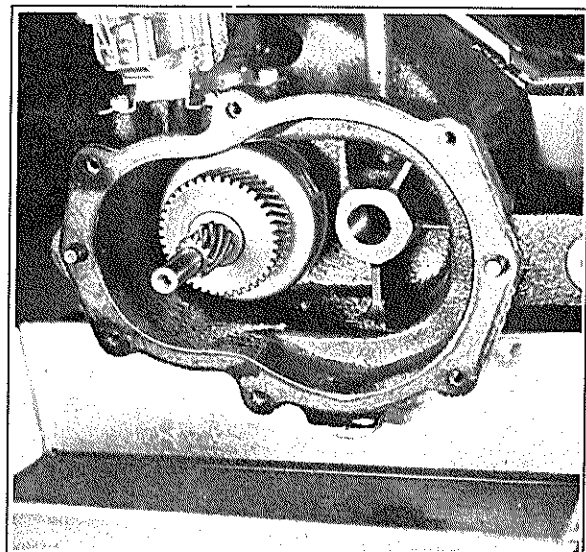


Figure 33
Clutch and Drive Gears in Place

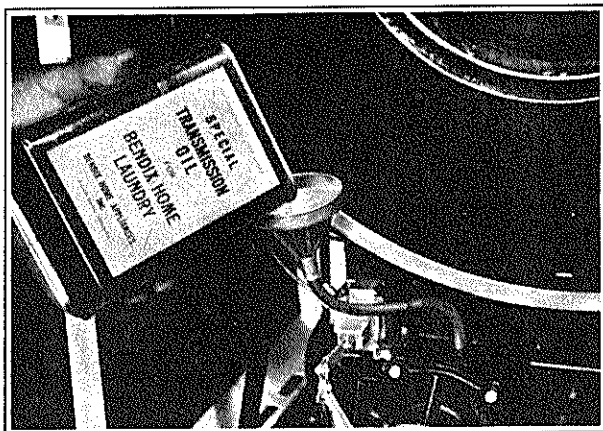


Figure 34
Adding Oil to Transmission

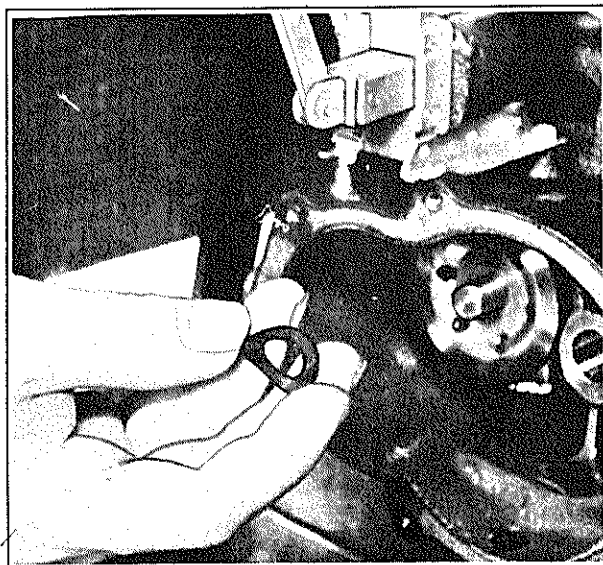


Figure 35
Inspecting Clutch Release Spring

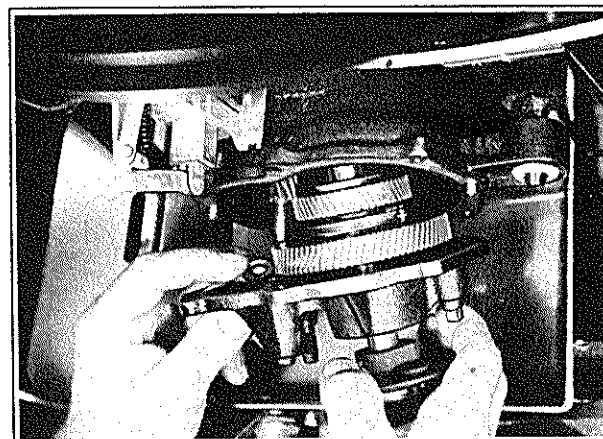


Figure 36
Installing End Plate and Jack Shaft Assembly
Showing Method of Holding Outer Thrust Washer

11. Put five ounces of new Bendix Transmission Oil in transmission.
12. Adjust clutch (See below)

TO ADJUST CLUTCH:

1. Check travel of shifter arm by pushing in on top of bell crank. From the point where arm reaches a solid stop to the point where armature is fully seated, armature travel should be $3/16$ inches.
2. If adjustment is needed, loosen adjusting screw lock nut, push shifter arm in to a solid stop and set screw so that solenoid armature has $3/16$ inches additional travel. Pencil lines drawn across the armature at the point of solid stop and at the bottom point will assist in making this adjustment accurately.

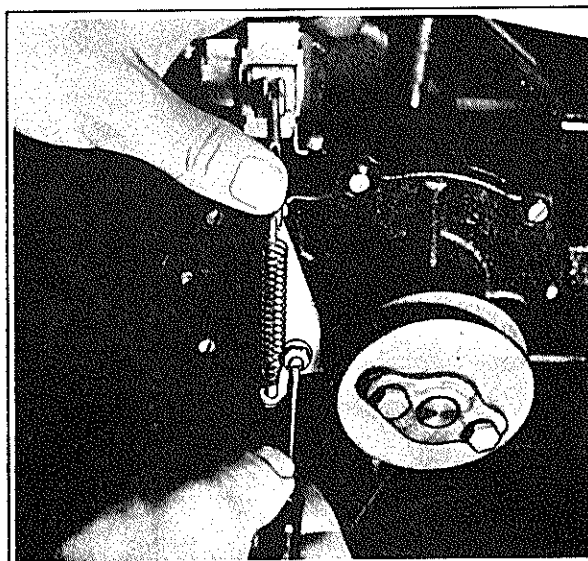


Figure 37
Adjusting Clutch

3. Hold set screw with small screw driver and lock adjusting screw nut.

TO REPLACE JACK SHAFT BEARING OR SEAL:

1. Follow steps 1 through 6 under "Clutch Plates."
2. Remove clutch and low gear assembly.
3. Remove drive pulley.
4. Remove jack shaft assembly; bearing will stay on jack shaft. To replace, press bearing off shaft and press on new bearing.
5. To replace seal, drive out of cover from inside and tap new seal into place with block and mallet, first coating outside diameter of seal with Glyptol. Set seal just against retaining ring and not flush with cover.

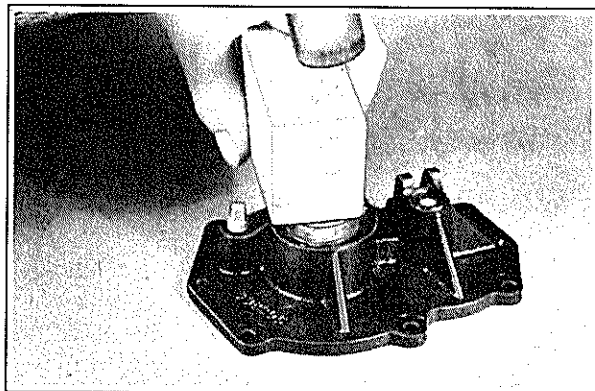


Figure 38
Installing Jack Shaft Seal

6. Install jack shaft and bearing assembly in transmission housing, and insert low gear with thrust washers.
7. Install end plate assembly, using seal tool No. ST145 to protect seal.

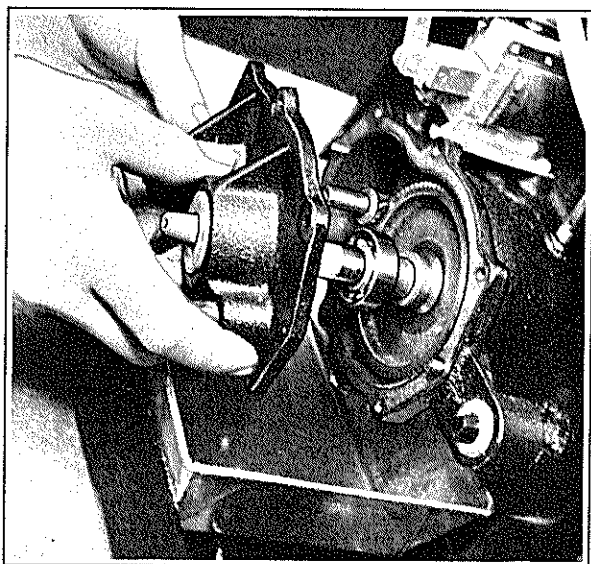


Figure 39
Installing End Plate Using Seal Tool No. ST145

8. Complete assembly of transmission.

TO REPLACE MOTOR SHAFT SEAL:

1. Remove motor and transmission assembly from unit.
2. Remove transmission cover and gears from transmission.
3. Remove clutch release spring and pressure plate from motor shaft.
4. Remove cup washer on motor shaft, and remove thrust ring (Fits into slot in motor shaft).
5. Remove four through-bolts that secure transmission housing to motor. (Heads are

on pump end of motor.) Remove transmission housing.

6. Drive old seal out by inserting a hooked tool through motor shaft bearing from in-

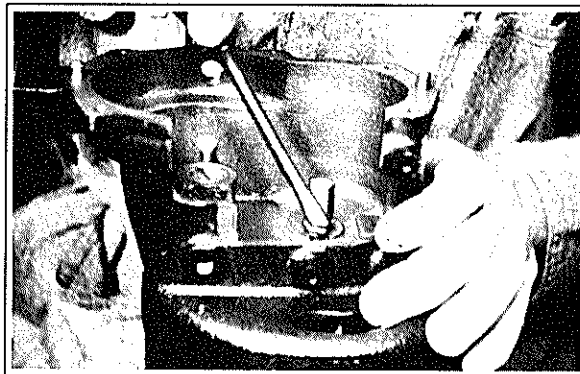


Figure 40
Removing Thrust Ring

side transmission housing. Do not allow tool to rest against bushing and damage it.

7. Clean old sealing compound out of seal recess and apply glyptol to surface before inserting new seal.
8. Insert new seal using seal tool No. ST148. Push down on tool enough to compress seal spring; then tap tool lightly with a hammer to seat seal. Tool may also be used in arbor press.

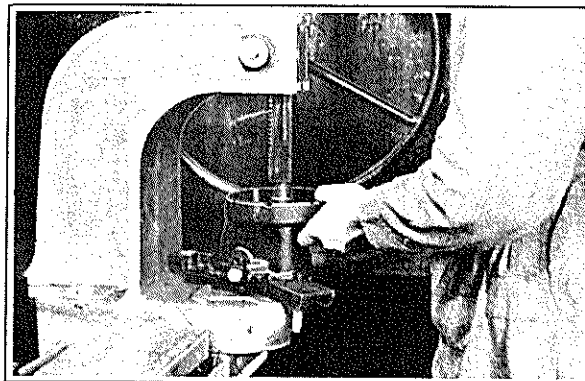


Figure 41
Inserting Motor Shaft Seal with Arbor Press

9. Inspect steel sealing washer on rotor shaft. If washer is grooved or cupped it should be replaced. This washer is part of the motor, and motor should be taken to nearest United Motors Service Station or General Electric Replacement Depot.
10. Reassemble transmission. In installing thrust ring on motor shaft, it will usually be found that a new ring is needed. This ring must be crimped all the way around so that cup washer will slide over it freely.

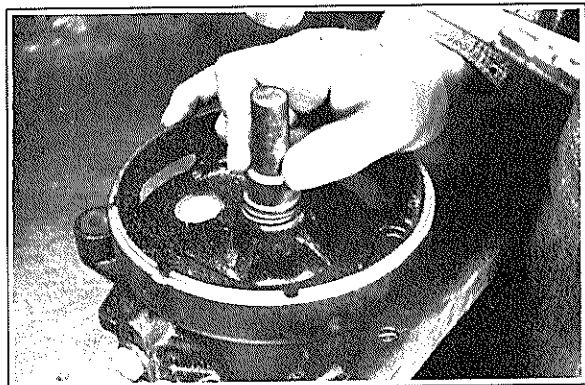


Figure 42
Inserting Motor Shaft Seal with Hammer and
Seal Tool ST148

TO REPLACE SHIFTER ROD AND SEAL ASSEMBLY:

1. Remove cotter key in pivot pin at base of shifter.
2. Remove old shifter rod assembly. On some units, it may be necessary to remove transmission cover plate to remove old rod.
3. Insert new shifter rod using inserting tool No. ST144.

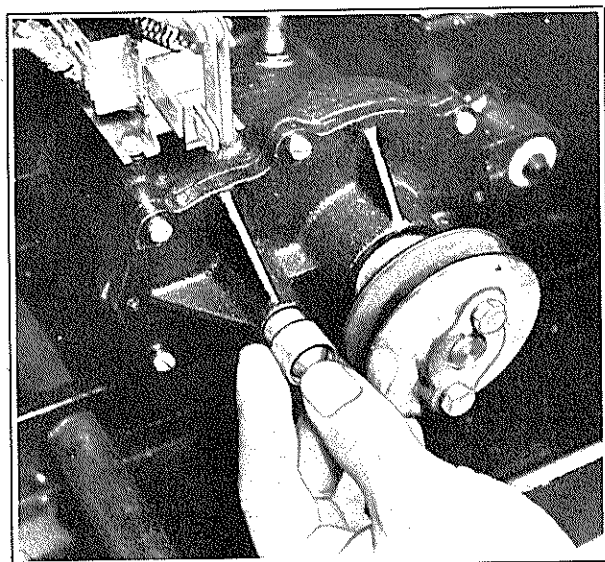


Figure 43
Inserting Shifter Rod Using Tool No. ST144

4. Replace pivot pin and cotter key.
5. Check clutch adjustment.

TO DISASSEMBLE JACK SHAFT ASSEMBLY:

1. Follow steps 1 through 6 under "Clutch Plates."
2. Remove transmission drive pulley.
3. Remove jack shaft assembly.

4. Remove thrust washer on inner end of jack shaft. Note groove in this washer and in reassembling be sure groove is placed next to high gear.
5. Remove high gear retaining ring.

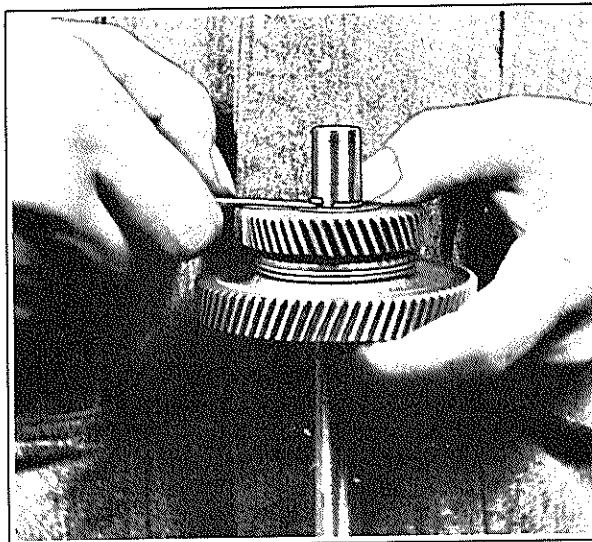


Figure 44
Removing High Gear Retaining Ring

6. Remove high gear and split washer.
7. Remove high gear woodruff key.
8. Remove low speed clutch. Thread retarder spring from clutch and leave attached to low gear.
9. Remove low speed clutch screw and woodruff key.
10. Remove low gear and split washer.

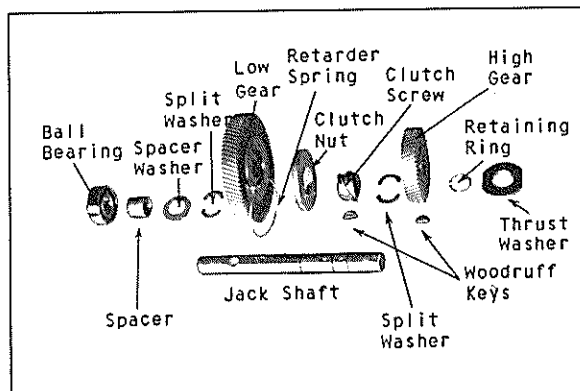


Figure 45
Parts of the Jack Shaft Assembly

11. Remove thrust washer and spacer sleeve.
12. Remove jack shaft bearing. (Bearing is a press fit on shaft)

In assembling jack shaft assembly, install low speed gear and other parts in order, reversing steps 10 through 4. Then install thrust washer and spacer on bearing end and install bearing. Follow steps 6, 7, and 8 under "Replacing Jack Shaft Bearing or Seal."

We recommend that, in replacing a transmission gear, its companion gear (the one with which it meshes) also be replaced. Otherwise a noisy assembly is likely to result. Also, the clutch plates should be replaced as a complete set and the same instructions hold good for the low gear clutch and screw. In line with these recommendations, the factory supplies these various parts in kit form only, and you will find them so listed in your Service Parts Catalog.

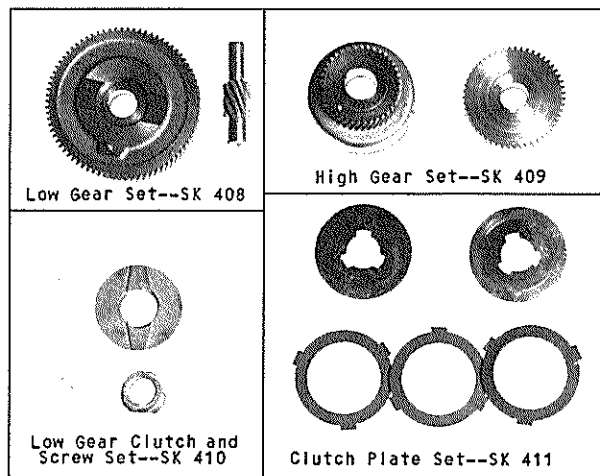


Figure 46
Service Kits of Transmission Parts

THE DRAIN PUMP is of the centrifugal type and is the means by which water in the tub is drained out of the unit at the proper times during the cycle. It provides two advantages in operation in that it decreases the length of time necessary to drain the unit over the time required if a gravity drain were used, and it makes possible draining the unit into a receptacle which is above floor level.

The pump housing is mounted on the motor end bell with two cap screws and is sealed to the end bell with a gasket. The pump impeller is mounted on the end of the motor shaft and is located in the proper relationship with the pump housing by means of a cone point, headless set screw. The impeller turns at motor speed all the time the unit is running. A seal is pressed into a recess in the pump housing and operates in conjunction with a steel washer, pressed into the impeller, to prevent flow of water out of the pump along the motor shaft.

Starting at serial number 121-B-435 the pump impeller was provided with four radial ribs on the back surface. The function of these ribs is to reduce the water pressure exerted on the

seal when the pump is draining the unit, thus reducing any likelihood of leakage at this point. Coincident with this change, the material in the impeller was changed from die-cast to plastic, but the mechanical operation was not affected, and the plastic impellers were made completely interchangeable with those just preceding.

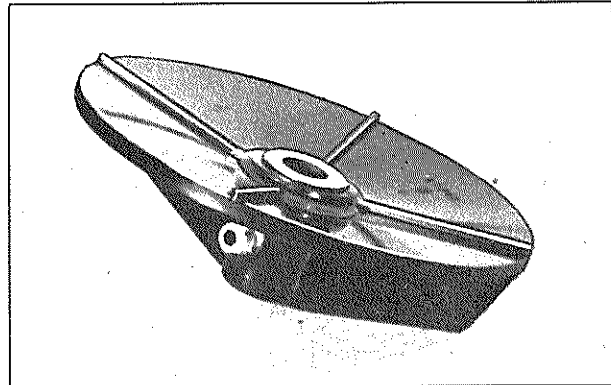


Figure 47
Pump Impeller, Showing Ribs on Back

The seal is of the compression type, sealing being effected by a metal to metal contact between an oilite ring in the seal body and the steel washer in the impeller. The seal is made up of two members which are held together by a servine boot, the outer member having incorporated in it the oilite seal face. The outer member is free to move in a direction parallel to the motor shaft and is interlocked with the inner member so that it cannot turn. A phosphor bronze spring inserted between the members tends to push them apart and delivers the pressure which keeps the faces pressed together.

THE DRAIN VALVE ASSEMBLY is built into the pump cover and controls the draining of water by opening and closing automatically at the proper times. Electrical control of the valve is provided by a solenoid similar to the transmission shifter solenoid which is mounted on the pump cover and is connected to the drain valve by means of a rocker arm, a coil spring being provided to close the valve when the solenoid releases.

The drain valve plunger operates in a horizontal plane, being supported by a plastic gland, or bearing, which is held in the cover by a snap ring. One end of the plunger is provided with a coined, stainless steel cap shaped to conform to the brass valve seat into the pump cover, and the other end is machined to fit the slot in the rocker arm.

Sealing the plunger stem is effected by a ribbed, neophene diaphragm, or boot, which is conical in shape and is held in place by a cup washer assembled behind the gland. The small end of the diaphragm fits tightly around the plunger stem and moves with the plunger. Thus,

when the valve opens, the diaphragm collapses, maintaining closure between the inside of the valve and the atmosphere without the necessity for a sliding contact. As the valve closes, the diaphragm returns to its normal shape.

The pump cover is assembled to the pump with six machine screws and is sealed to the pump with a composition gasket. Entry of water into the pump is made through a hole in the pump cover placed at the center or point of lowest pressure. Flexible connection of the drain valve to the tub drain sump is made through a rubber hose so as to allow for movement of the motor, pump, and transmission assembly during operation.

SERVICE INSTRUCTIONS

TO REPLACE DRAIN SOLENOID:

1. Remove cabinet front panel.
2. Disconnect wiring harness from solenoid.
3. Remove solenoid mounting screws and remove solenoid, holding rocker arm in place.
4. Install new solenoid, reversing steps 3 through 1.

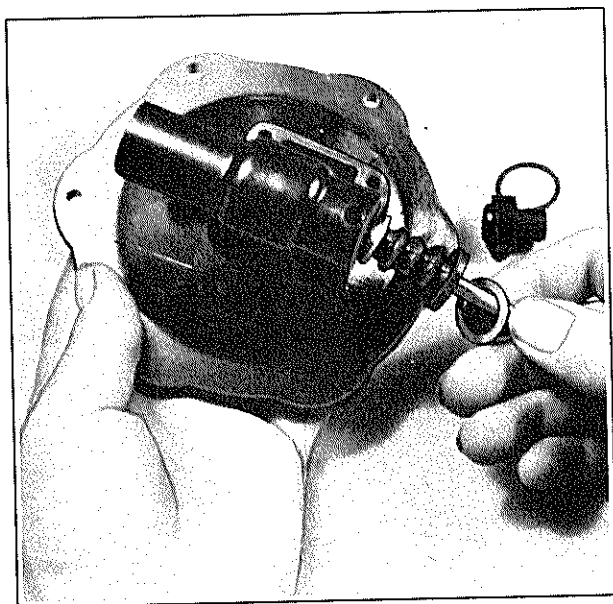


Figure 48
Disassembling Drain Valve Assembly

TO REMOVE PUMP COVER AND DRAIN VALVE ASSEMBLY:

1. Remove cabinet front panel.
2. Disconnect tub-to-pump hose at drain valve.
3. Remove drain solenoid, rocker arm, and spring.
4. Remove five pump cover mounting screws and rocker arm pivot stud.
5. Remove pump cover assembly.

TO DISASSEMBLE PUMP COVER AND DRAIN VALVE ASSEMBLY:

1. Remove gland snap ring.
2. Remove gland, cup washer, and plunger and diaphragm assembly.
3. Remove diaphragm from plunger.

To Reassemble reverse steps 3 through 1. In replacing pump cover on pump, it is good practice to use a new gasket.

TO REPLACE PUMP SEAL:

1. Remove pump cover assembly.
2. Remove pump impeller. Use set screw wrench, part No. ST102.
3. Disconnect drain hose.
4. Remove two pump mounting screws and remove pump housing assembly.
5. Remove seal by driving out from outside of housing, using handle end of seal tool No. ST148.
6. Apply Glyptol to seal recess and insert new seal, using seal tool No. ST148. When seal is set in place, compress spring by pushing down on seal tool. Drive seal home with light hammer blows. See Fig. 42.
7. Reinstall pump housing, using new pump-to-motor gasket.
8. Inspect thrust washer in impeller. If washer is grooved, install new impeller, making sure that set screw enters locating hole in motor shaft.
9. Install pump cover and drain valve assembly and test.

TIME CONTROL AND SELECTOR SWITCH ASSEMBLIES

*Model B—Deluxe Automatic
Serial No. 72-B-001 and Above
Model S—Standard Automatic
Serial No. 73-S-451 and Above*

THE TIME CONTROL ASSEMBLY or Timer is a device for coordinating the electrically controlled assemblies of the Bendix unit by opening and closing their electrical circuits, so as to cause them to perform their various functions at the proper times during the cycle.

On units with serial numbers below Serial No. 148-B-134 the construction of the time control is very similar to that of the one described and illustrated in Sections IV and V of this book. The main difference lies in the method of mounting; the timer is now mounted to its bracket by means of screws which thread into tapped holes in the timer case. Five cams are used instead of six, as only two cams are needed to control the inlet valves instead of three as before. The function of the various circuits of the time control can be understood by studying carefully the wiring diagram, Fig. 67.

Beginning with serial number 148-B-134 the mechanical construction of the timer was considerably altered although the operating principle and the timer function remain the same. The following description applies to this latter timer.

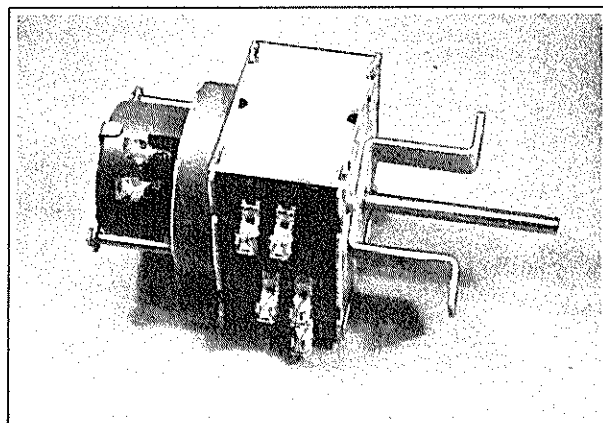


Figure 49
Time Control Assembly

The timer is a set of four switches all having one common terminal which is connected to one side of the power circuit. The switches distribute current to the various electrical parts of the unit as the cam assembly causes them to make contact.

The switch arms are phosphor bronze springs riveted to terminal blocks of insulating material and fitted with silver contact points to match similar points on the stationary contacts. The

cam followers on the contacts arms are near the middle, while the contacts are at the end; consequently the movement of the arm at the contact point is approximately double the movement at the point where the follower touches the cam. This assures ample clearance for the points and keeps arcing at a minimum. The area of the contact controlling the motor circuit is approximately twice the area of contacts controlling the other circuits to allow for the extra current load which it must carry.

The contacts are provided with plug-in connectors, and identifying letters are stamped into the terminal block beside each connector to conform with the color-coding of the wires in the wiring harness.

Reading from the timer motor outward, the first three switches control respectively, the motor and timer motor, drain solenoid, and mixed or hot water inlet valve for the wash period (depending upon the setting of the selector switch). These switches are of the single pole, single throw type. The fourth switch is of the single pole, double throw type, and controls the mixed water inlet valve and the shifter solenoid by means of a cam which is cut to combine the functions of the Nos. 2 and 5 cams in the timer used below serial No. 148-B-134. By studying the timer closely with the cover plate removed, it will be noted that when this cam allows the arm to drop into a slot, connection is made to the contact controlling the mixed water inlet valve. To break the circuit the arm is raised to a neutral position midway between the two contacts, and from that position a riser on the cam pushes the arm up at the proper time to contact the shifter solenoid terminal.

The timer motor is geared to a spring driven escapement, and the escapement in turn drives the camshaft. The time interval between impulses is 49.2 seconds and the amount of rotation of the cam assembly per impulse is five degrees. Thus 72 impulses are required to produce one complete rotation of the shaft and the total time represented is one hour. The two "Off" positions on the dial occupy thirty degrees of space on the motor cam, so actually only about fifty-five minutes of operating time are available for any one cycle. This cycle is usually shortened further by the operator in setting the control knob for the desired washing time.

The cam shaft extends out of the timer case and forms the shaft for the control knob. The knob is keyed to the shaft with a set screw-spring and plunger arrangement that prevents backward rotation by engaging the shaft only when turned in a clockwise direction. A ratchet is provided in the escapement that permits the cam shaft to be advanced clockwise at any time without interfering with the action of the escapement or motor.

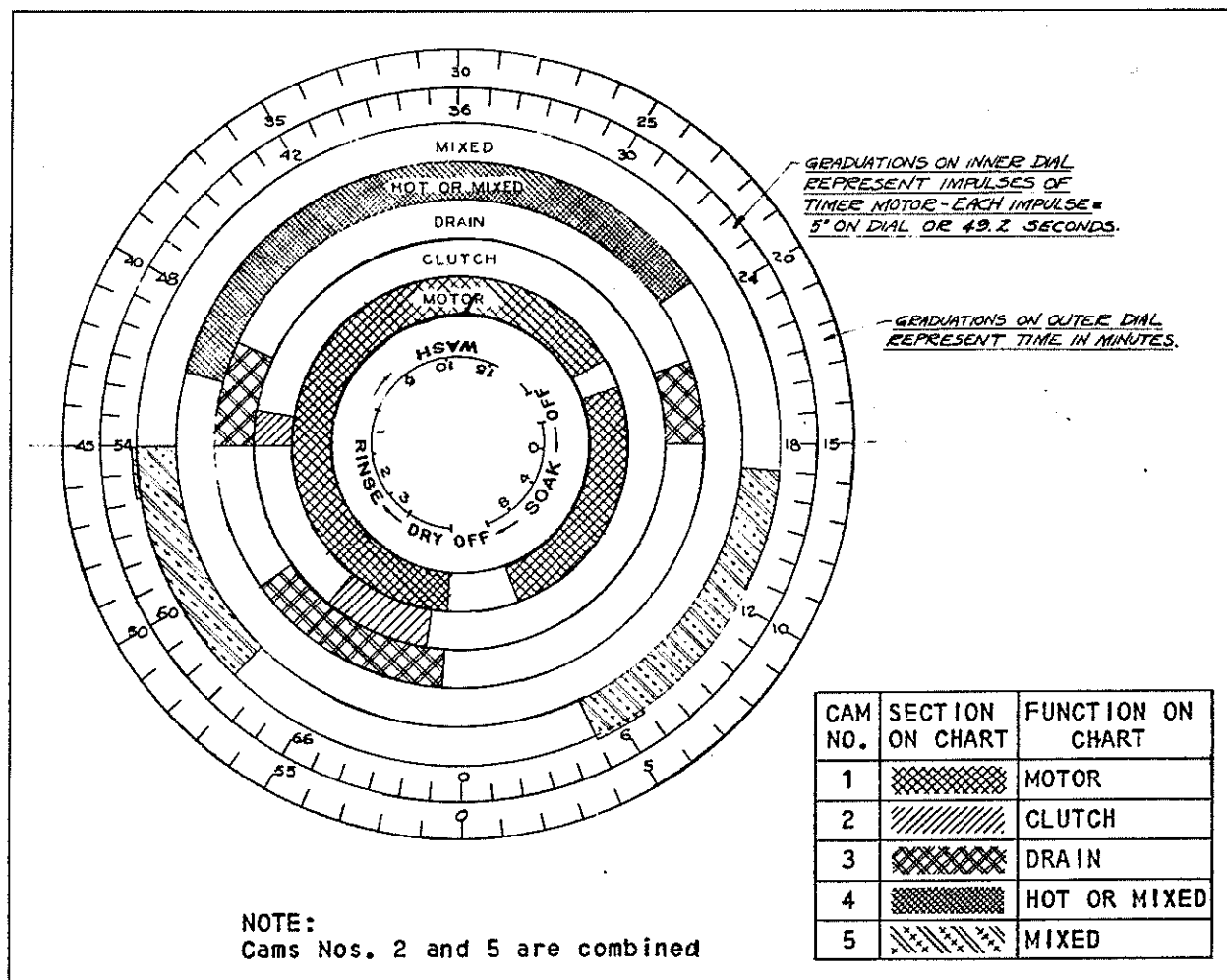


Figure 50
Time Control Chart. Units Above
Serial No. 148-B-134 Only

On Deluxe units with serial numbers between 64000 and 95-B-923 the timer is mounted on the cabinet front panel, and on units above 95-B-923 it is mounted on a bracket at the back of the unit which is fastened to the tub. In the former case, the timer dial is part of the front panel and the indicator is a pointed knob fastened to the timer shaft. In the latter case, the calibration marks are on the knob itself, the knurled edge projecting through a slot in the top panel to permit turning of the knob by the operator.

The timer on Standard units has always been mounted on a control panel at the back of the unit. On units with serial numbers between 74450 and 93-S-601, the control panel is mounted on the tub back assembly, and the knob and dial are identical to those used on the earlier DeLuxe Unit. Above serial number 93-S-601, the timer is mounted on a bracket which, through another bracket, is mounted on the tub, the dial in this case being the knob itself which is properly calibrated and fitted with a nicked pointer to indicate the setting.

THE SELECTOR SWITCH is a single pole, double throw, snap switch connected into the electrical circuit of the inlet valve so as to permit selection by the operator of hot or lukewarm water for the washing and first rinsing operations.

The center arm on the switch is connected to the fourth contact finger on the timer and by referring to the time control chart, Fig. 49, and the wiring diagram, Fig. 67, you will note that the switch is energized only during the wash and first rinse periods. At all other times it is out of the circuit. One contact on the switch is connected to the "hot" inlet valve solenoid and the other to the "mix," or lukewarm, inlet valve solenoid. Thus, depending on the setting established by the operator, either the hot or the mixed water inlet valve will open when the timer is turned into the wash period.

The selector switch terminals are fitted with plug-in receptacles, and the back cover is stamped with identifying letters for each term-

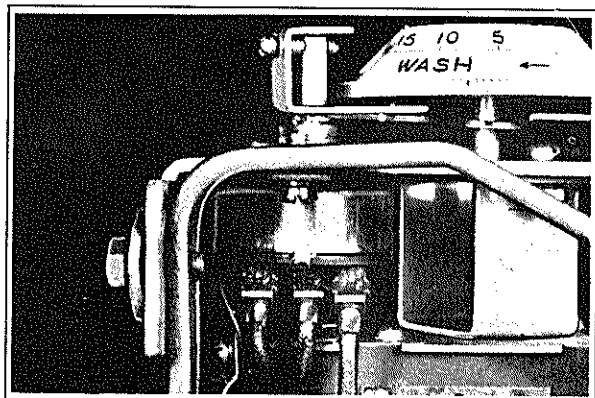


Figure 51
Selector Switch Assembly

inal corresponding with the color coding of the wiring harness.

A mounting bracket is welded to the body of the selector switch and mounting is made by means of two screws through this bracket. As in the case of the timer, on earlier units the switch mounted on the unit front panel, a dial and knob being provided to indicate the proper setting. On DeLuxe units starting with serial number 95-B-923 the switch is mounted on the same bracket that holds the time control and a crank on the switch shaft is linked to a special operating lever. The front arm of this lever protrudes the timer dial escutcheon just under the timer dial, and is fitted with a small knob. The escutcheon is stamped with the words "Hot" and "Warm" to indicate the setting.

On Standard Units below serial number 93-S-601 the selector switch mounted on the control panel with the timer and the dial and knob are identical to those on the DeLuxe Units in the same series. Units above that serial number have the switch mounted on the same bracket with the timer, and in this case the words "Hot" and "Warm" are stamped on the knob which is designed to match the knob on the timer.

SERVICE INSTRUCTIONS

TO REMOVE TIMER:

Deluxe Units—Serial No. 72-B-001 to 95-B-923
—See Section IV.

Deluxe Units—Above Serial No. 95-B-923:

1. Remove cabinet top panel.
2. Remove set screw, spring, and plunger in timer knob and remove knob.
3. Remove timer mounting screws.
4. Disconnect power cord from timer.
5. Disconnect wiring harness from timer.

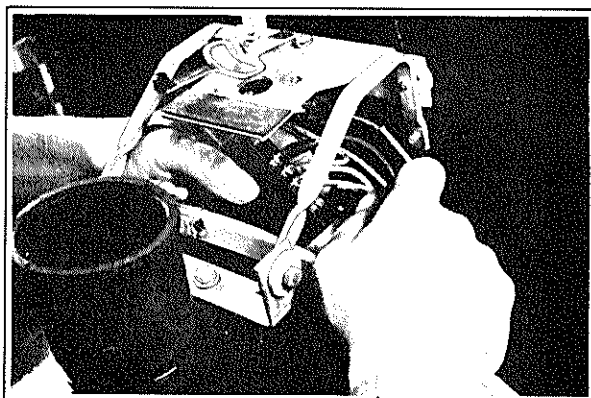


Figure 52
Removing Time Control Assembly

Standard Units—Serial 73-S-451 to 93-S-601.
See Section IV.

Standard Units—Above Serial No. 93-S-601.

1. Remove back panel.
2. Remove timer and selector switch knobs.
3. Remove screws holding timer and selector switch mounting bracket to rear guard assembly. This will also remove pointers. Hold timer with one hand, as assembly will be free when screws are removed. See Fig. 4, Sec. III.
4. Disconnect wiring harness and power cord from timer.
5. Remove screws holding timer to mounting bracket.

Installation of the timer is a reversal of the above procedures.

TO REPLACE CONTACT BLOCK ASSEMBLY: (Units below Serial No. 148-B-134 Only)

1. Remove timer from unit.
2. Remove timer cover.
3. Remove contact block assembly and replace with new block.
4. Turn timer shaft through one complete rotation to make sure contacts are operating properly. Do not attempt to adjust finger tension; this is set at the factory, a gram scale being employed to insure tension being within proper limits.

TO REPLACE CONTACTS—Units above Serial No. 148-B-134:

1. Remove timer from unit.
2. Remove motor and escapement assembly.
3. Remove cam and gear assembly by working back and forth and exerting slight pull.

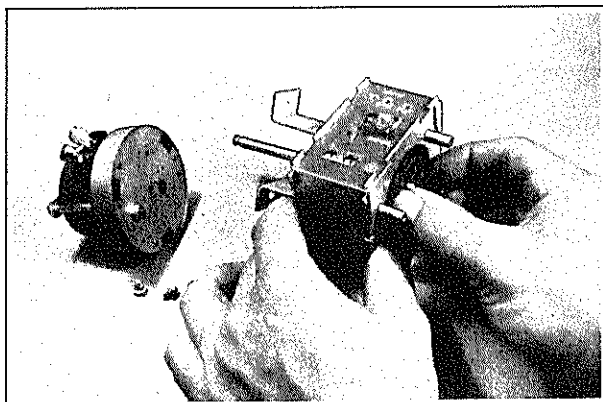


Figure 53
Removing Cam and Gear Assembly

4. Install cam and gear assembly in new terminal block and frame assembly. Turn back and forth and exert only slight pressure so as not to spring contacts.
5. Install motor and escapement assembly and adjust. (See below.)

TO REPLACE MOTOR AND ESCAPEMENT ASSEMBLY: (All Units)

1. Remove timer from unit and remove cover.
2. Remove contact block assembly.* Units below serial No. 148-B-134 only.
3. Remove three screws holding escapement to timer body and remove escapement with motor.
4. Replace escapement and motor as follows: Guide escapement into timer case in approximately the correct position, and make sure that end of cam shaft enters hole in brass plate. Escapement will not go into place until shaft is properly located. Insert the three mounting screws but do not tighten, and rotate escapement assembly until screws are in right hand end of slot. (Looking at timer from the front.) Install contact block assembly.

*Turn timer clock clockwise to the position where a finger has just lifted and with the finger in a lifted position, take up the backlash by turning timer shaft in a counter-clockwise direction as far as it will go without forcing it. A knob used on the timer shaft will assist in getting the proper setting. Hold it there while, with the other hand you rotate the escapement and motor counter-clockwise until cam follower is setting exactly on top of riser in cam. (See Figs. 54 and 55.) Release timer shaft without allowing escapement to move from position just established and tighten screws. To check setting, turn shaft until any finger has just lifted and take-up backlash by turning shaft in a counter-clockwise

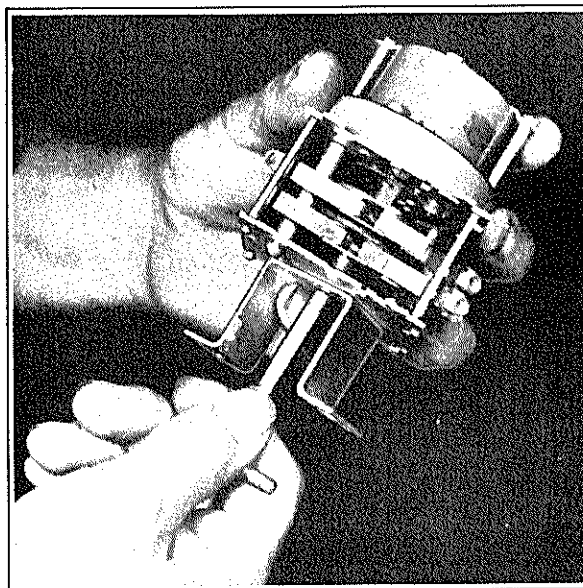


Figure 54
Adjusting Escapement—Above Serial No. 148-B-134

direction. On a properly set timer, the finger will come just to the edge of riser in cam without slipping over the edge. If it will slip over the edge when the backlash is taken up, the escapement is not properly set and should be readjusted.

5. Install timer cover.

TO REPLACE CAM ASSEMBLY: (Units below Serial No. 148-B-134 Only)

1. Remove timer from unit.
2. Remove contact block assembly.
3. Remove escapement and motor assembly.
4. Replace cam assembly.
5. Reinstall escapement and motor assembly and contact block assembly following directions in step 4 above.

TO REPLACE CAM ASSEMBLY: (Units above Serial No. 148-B-134 Only)

1. Remove timer from unit.
2. Follow steps 2 through 5 under "To Replace Contacts".

Disassembly of the timer sub-assemblies mentioned above is not recommended. Service parts for these sub-assemblies are not carried in stock at the factory.

TO REMOVE SELECTOR SWITCH:

Deluxe Units—Serial No. 72-B-001 to 95-B-923—See Section IV.

Deluxe Units—Above Serial No. 95-B-923.

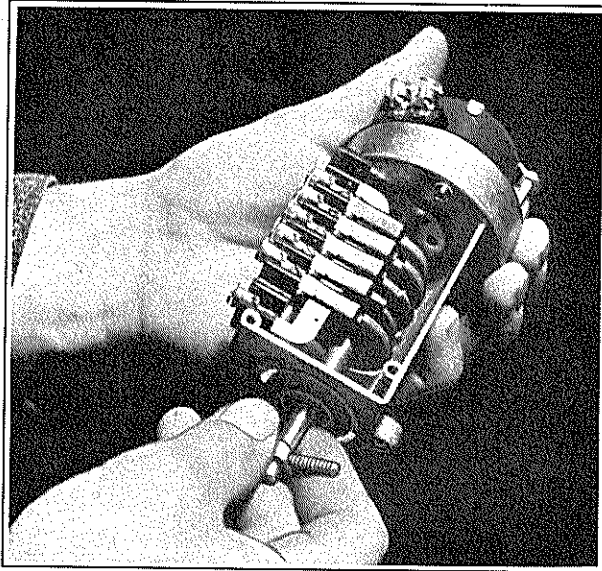


Figure 55
Adjusting Escapement—Below Serial
No. 148-B-134

1. Remove cabinet top panel.
2. Disconnect wiring harness from selector switch.
3. Remove set screw in crank arm.
4. Remove selector switch mounting screws and lockwashers.

Standard Units—Serial No. 73-S-451 to 93-S-601
—See Section IV.

Standard Units—Above Serial No. 93-S-601:

1. Follow steps 1 through 3 under removal instructions for Standard Model timer.

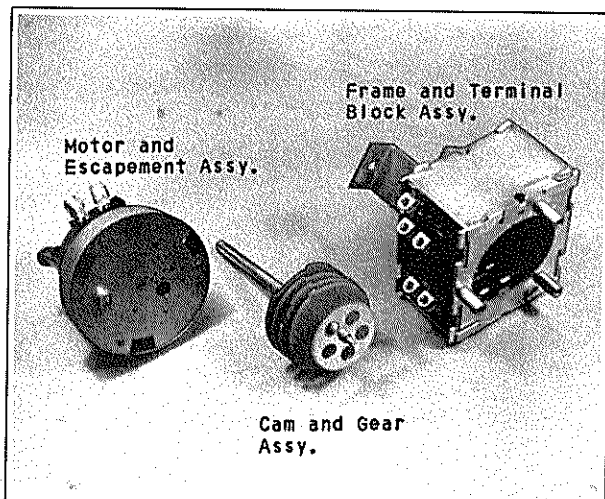


Figure 56
Timer Sub-Assemblies—4 Cam, Box-Type Timer

2. Disconnect wiring harness from switch.
3. Remove switch mounting screws, nuts, and lockwashers.

Installation of the selector switch on the Deluxe or Standard Unit is a reversal of the above instructions.

TO ADJUST TIMER AND SELECTOR SWITCH MOUNTING BRACKET:

Deluxe Units—Above Serial No. 95-B-923

Adjustment in a front-to-back direction and a certain amount of vertical adjustment for the timer mounting bracket is provided in the clearance around the screw holes in the bracket to which the back panel braces are mounted. To adjust the position of the braces, loosen the screws, set to the new position, and tighten. Additional vertical adjustment plus sidewise adjustment is provided by the clearance around the screws mounting the timer bracket to the braces. These screws may be loosened with the back panel in place.

In assembling the timer mounting bracket to the braces, and in mounting the braces on the tub bracket, set the screws to approximately the center of the clearance hole and tighten. Install the unit back panel, and insert the back-panel-to-brace screws, adjusting the braces at the tub if necessary. Then install the top panel and note the position of the timer knob with reference to the escutcheon. It should be centered in the opening in both directions. (See Fig. 3.) If not centered, remove the mounting screws at the back, one at a time, and move the bracket to the proper position. Replace the screws and tighten.

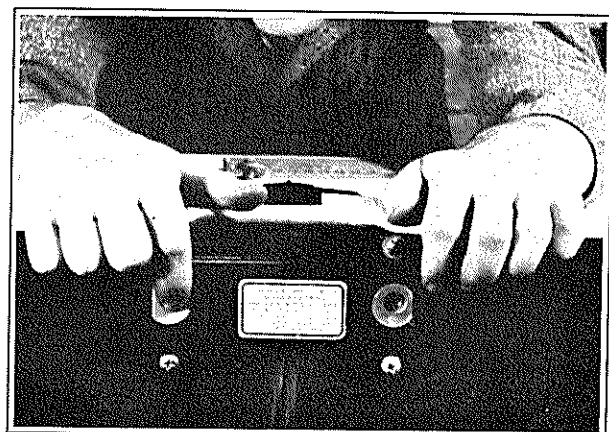


Figure 57
Adjusting Timer Mounting Bracket

TUB ASSEMBLY

*Model B—Deluxe Automatic
Serial Number 72-B-001 and Above*

THE BENDIX TUB has two major functions, that of holding the water in which the clothes are washed, and serving as a support, or framework, on which various components of the unit's mechanism are mounted.

The tub is a one piece drum drawn from sheet steel and porcelain enameled for cleanliness and durability. One end of the tub is left completely open and is flanged to receive the tub back clamp ring. The other end is partially enclosed, but is provided with an opening at the center to conform to a similar opening in the cylinder through which clothes are placed into the unit.

At the bottom of the tub a sump is provided into which the water drains as it flows out of the tub. The inlet to this sump is an opening in the bottom of the tub, and the outlet is a ferrule to which is connected the hose leading to the drain valve. A case is fitted into the drain sump and is held in place by a wire bail and a toggle latch, sealing being effected by a rubber gasket. This case in turn holds a screen which is designed to cover the opening of the tub so that all drainage takes place through it; thus it catches lint and foreign articles and prevents their entry into the drain valve and pump.

A hole is provided at the back of the drain sump and around it are set three small bayonet-head pins. This hole is for the entry of the float tube, and the pins are the means by which the tube lock is held in place. The float tube extends through the rear of the drain case and screen and serves as the rear support for these parts.

A flanged opening at the top of the tub and toward the back permits the introduction of soap into the unit. It is fitted with a rubber gasket that extends from the tub up to the soap door opening in the top panel and a metal grill fits tightly into this gasket to help hold it in place and to prevent the accidental entry of foreign articles into the tub.

The spray tube, through which incoming water flows, enters the tub through a hole in the tub back. It is a copper pipe held in place by steel clips, which are part of the tub, and an additional retainer clip at the front. It follows the outer wall of the tub around to the clothes door opening, where it connects with a nozzle which is designed to direct the water diagonally across the cylinder in a fan shaped spray of maximum effectiveness. The nozzle is mounted to the tub independently of the spray tube by means of two screws in the lip of the clothes door opening.

The tub is mounted to the base by means of four welded brackets which bolt to the front and rear cradles of the base assembly. Steel

brackets are welded to the front corner of the tub to serve as supports for the front and side panels on the Deluxe model.

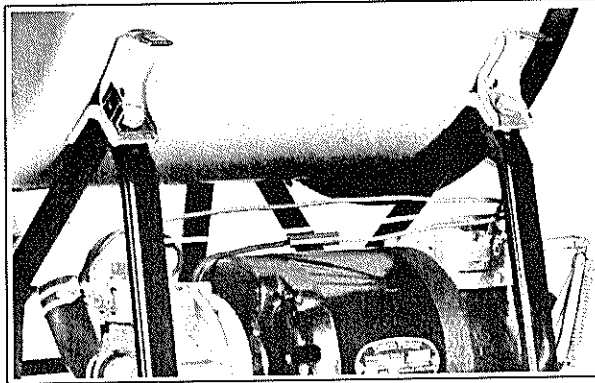


Figure 58
Tub Assembly, Showing Mounting Brackets

SERVICE INSTRUCTIONS

TO REPLACE DRAIN CASE GASKET:

1. Remove drain case and remove old gasket.
2. Install new gasket. Thickest section of gasket goes between drain case and tub.
3. Replace drain case and screen.

TO ADJUST DRAIN CASE GASKET FOR SEAL:

1. Remove drain case and inspect gasket.
2. If gasket appears to be in good condition, and does not appear to be slipping out of place, replace drain case and tighten adjusting screw on toggle latch until gasket is firmly compressed.

TO REPLACE SOAP DOOR GASKET OR GRILL: (Units above 95-B-923 Only)

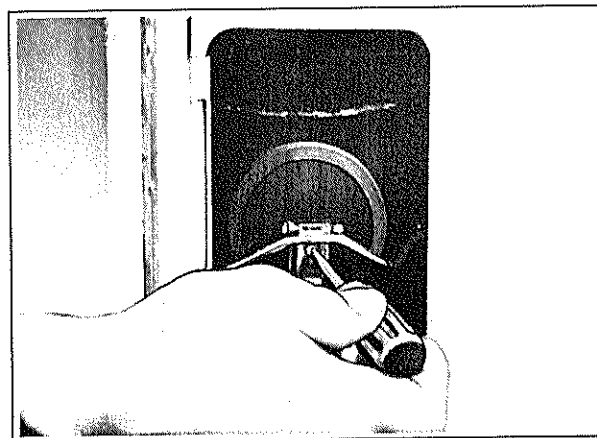


Figure 59
Adjusting Drain Case Toggle Latch

1. Remove top panel.
2. Remove soap door grill.
3. Remove soap door gasket and replace with new gasket, making sure that bead on outside goes down over soap door flange on tub.
4. Moisten grill with soapy water and install. A wooden block and mallet may be needed to completely seat grill in gasket.

TO REPLACE TUB ASSEMBLY: (Units above 95-B-923 Only)

1. Remove cabinet assembly.
2. Remove timer and selector switch with mounting as a unit, by removing bolts that secure mounting bracket to tub. See Fig. 10.
3. Remove tub back and cylinder assembly by following steps three through eight under "Cylinder Assembly-Service Instructions," Page 20.
4. Remove clothes door and latch and hinge brackets.
5. Remove drain screen and case.
6. Disconnect tub-to-pump hose at drain sump.
7. Remove spray tube and nozzle (See below).
8. Remove soap door gasket and grill.
9. Remove tub mounting bolts, nuts and lockwashers.
10. Set new tub in place and reverse steps 9 through 1. See Clothes Door Service Instructions for procedure on adjusting latch and hinge brackets.

TO REPLACE SPRAY TUBE AND NOZZLE:

(After tub back and cylinder assembly have been removed.)

1. Remove spray tube retainer clip (In front corner of tub).
2. Remove spray tube.
3. Remove spray tube nozzle by removing mounting screws, lockwashers, and gaskets in lip of clothes door opening.

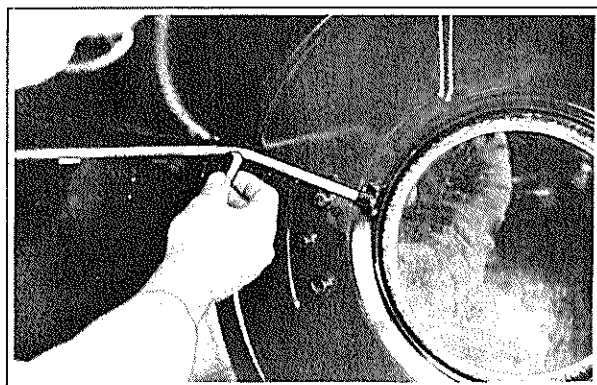


Figure 60
Installing Spray Tube

4. To reinstall, reverse steps three through one.

Model S-Standard Automatic—Serial No. 73-S-451 and Above.

The Standard Model Tub is identical in its mechanical construction and function to the Deluxe tub. However, since it is not entirely enclosed by a cabinet, its appearance is a decided factor in the overall appearance of the Standard Unit, and for that reason the exterior is finished in white porcelain enamel to match the white clothes door and the white panels. Also, decorative ridges are built into the front of the tub to conform with similar ridges in the clothes door and with the drain door.

The soap door opening is in the same location as the Deluxe soap door opening, but in this case a single molded rubber retainer serves as both gasket and hinge for the soap door. The door is made of molded plastic and has the words, "Bendix Home Laundry" stamped into it.

SERVICE INSTRUCTIONS

TO REPLACE SOAP DOOR RETAINER OR GRILL:

1. Remove soap door by spreading retainer until door hinges will clear.

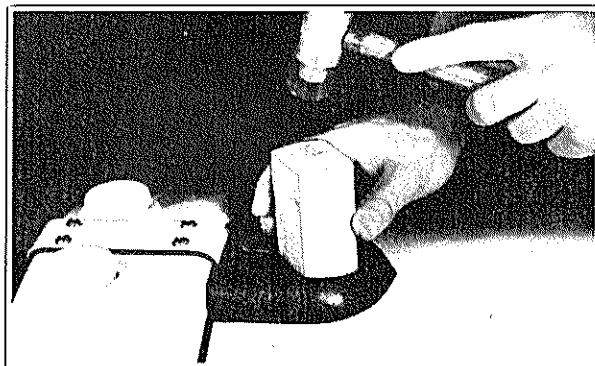


Figure 61
Installing Soap Door Grill

2. Remove grill.
3. Remove retainer.
4. Install new retainer making sure that bead, which goes inside tub, snaps into place all the way around.
5. Moisten grill with soapy water and install. A block of wood and a mallet may be needed to completely seat grill.
6. Install soap door.

In servicing the tub or any of its parts, the procedure is the same as that for the Deluxe Unit after the panels and the rear guard assembly have been removed.

The tub back and bearing assembly is the rear enclosure for the tub and is the support for the cylinder shaft. It also serves as the support for the float assembly and the mixing valve.

TUB BACK AND BEARING ASSEMBLY

The assembly consists of two conical steel discs fastened together at their outer edges and fastened to a hollow steel hub at their centers. Pressed into the hub are two ball bearings and a water seal, a spacer being provided between the two bearings to keep them the proper distance apart after assembly.

The two cones are heavily reinforced at their centers, and the steel hub is made of heavy seamless steel tubing so as to give an assembly of sufficient strength to withstand the stresses placed upon it by the spinning cylinder. The inner cone is porcelain enameled, and the machined area at the center is metal-sprayed with zinc as this cone is in contact with the water in the tub. The outer cone is finished with black baked enamel.

The tub back is assembled to the cylinder as shown in Fig. 62. Spacers provide the proper relationship of distances between the cylinder,

hub which has a hole at the bottom where the water may run out.

The cylinder shaft bearings are ball bearings of the sealed, self-lubricated type. When the bearing is made, it is packed full of high quality, free flowing lubricant, and seals are then assembled between the inner and outer races of the bearing, on each side, to keep the lubricant from escaping. These bearings need no further lubrication.

SERVICE INSTRUCTIONS

Removal instructions for the tub back assembly will be found on page 20 under "The Cylinder Assembly."

TO REPLACE TUB BACK WATER SEAL OR BEARINGS: (Units above 77-S-101)

1. Remove tub back assembly from unit.

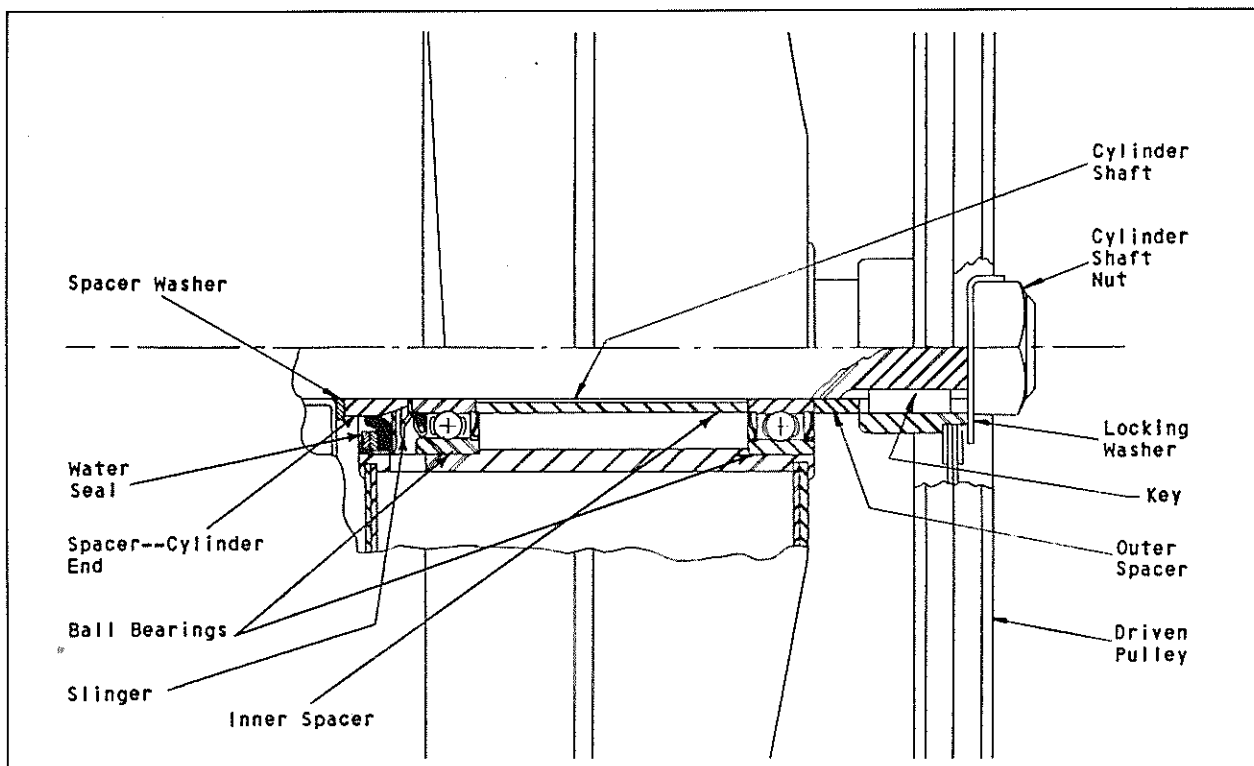


Figure 62
Cross Section of Tub Back Hub and Bearings

bearings, and pulley. The diameter of these spacers is the same as that of the inner races on the ball bearings, and when locked in place by the pressure from the cylinder shaft nut they rotate with the shaft. A slinger is assembled between the stainless steel inner spacer and the inner bearing, so that any water which passes the seal will be picked up and thrown to the

2. Remove water seal and bearings. Drive out bearings by using a long punch or section of wood dowel and a mallet.
3. Install new bearings, using an arbor press to seat them against shoulders in hub, or following procedure below. Make sure that inner spacer is assembled between bearings.

NOTE:—Pulley-end bearing, part No. 98293, may be assembled with either side toward pulley, as its inner race is not offset. However, cylinder-end bearing, part No. 98193, which has its inner race slightly offset should be assembled with the raised side toward the cylinder. Reversing this bearing will make it impossible to seat both bearings against their respective shoulders in the hub, as the inner spacer will interfere.

4. Install slinger with raised portion against bearing race. If in doubt about proper position, note that when assembled correctly, slinger will turn with inner race of bearing. When assembled incorrectly, slinger will scrape against bearing or will not turn at all.
5. Install water seal. Use block and mallet to set seal just flush with hub.

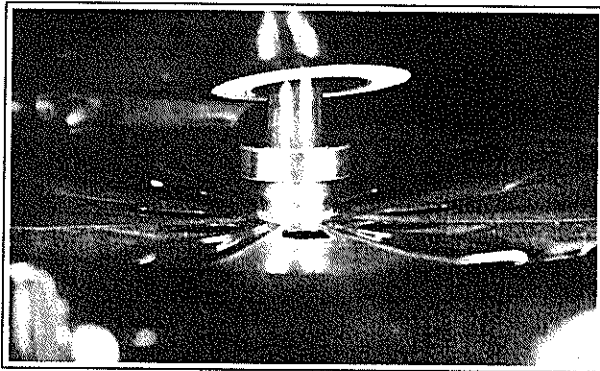


Figure 63
Bearing in Place Ready to be Pressed In

In the absence of an arbor press, the following method may be employed to install tub back bearings, utilizing the cylinder shaft and nut as a press:

1. Place cylinder on floor with shaft in vertical position. Assemble inner spacer (beveled side out) on cylinder shaft with proper number of washers underneath it. See Page 21.
2. Place cylinder-end bearing on shaft, raised side of race against spacer.
3. Place tub back on cylinder shaft, inner (porcelained) side toward cylinder.
4. Set pulley on shaft and add enough spacers so that only part of threads are exposed.
5. Start cylinder shaft nut and tighten, first making sure that bearing starts in hub in proper alignment.
6. Tighten nut until it reaches end of thread; then add another spacer and continue tightening until bearing bottoms against shoulder.
7. Remove tub back from shaft and install slinger and water seal. (See steps 4 and 5 above.)



Figure 64
Tightening Nut to Press In Bearing. Note Extra Spacer Being Used

8. Replace tub back on shaft in same position as before.
9. Install inner bearing spacer.

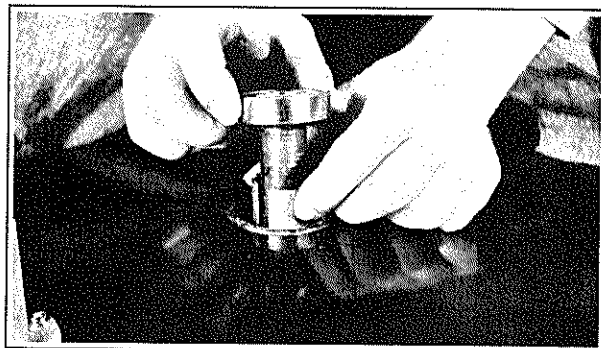


Figure 65
Installing Inner Spacer

10. Assemble pulley-end bearing, outer spacer, key and driven pulley, locking washer, and nut on shaft in order mentioned. Tighten nut until bearing bottoms against shoulder.
11. Lock shaft nut with locking washer.



Figure 66
Tightening Cylinder Shaft Nut



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WIRING HARNESS

All electrical parts of the Bendix unit are connected together by means of flexible conductors, covered with lacquered, moisture resistant insulation, and color coded for easy identification. The wires are taped together into a harness similar to those used for automobile wiring, and the wires are cut to the exact length to minimize slack and assure neatness in assembly.

All components except the motor are fitted with receptacles to accommodate the plug-in tips on the ends of the harness wires. These fittings are designed so that connections are easily made by snapping the tips into place, and at the same time they are able to withstand a considerable pull before the connections are broken.

Connections to the motor are made through pig-tail leads that are connected directly to the motor windings. The ends of these leads have plug-in tips, as do the corresponding ends of the wiring harness. The wires are connected by means of two wire connectors—small plastic cylinders that have double-ended receptacles on the inside.

The unit power cord is an Underwriter-approved, heavy duty, flexible cord, covered with rubber and having heavy twine interlaced with the wires to give mechanical strength. The plug is of soft moulded rubber and is non-breakable. The power cord is brought into the unit through the back panel and is held in place by a strain-relief to remove any strain from the time control. The wires have tips, one of which plugs directly into the timer, the other connecting to the wiring harness through a two-wire connector.

A ground wire is provided with each unit to be used in connecting the chassis of the machine to a good electrical ground. This is a protection to the operator in the case the unit, through

failure of insulation at some point, becomes connected to one side of the electrical line and is thus "hot" to ground. The ground wire is heavy enough to carry a current that would blow the house fuse in such an instance.

On some units, the ground wire is connected to a screw in the base and, for shipment, is left coiled up inside the base. On later units, the wire will be shipped in the accessory bag and is to be connected to the brass screw in the back of the base.

The wiring circuit of the unit is illustrated in Fig. 67, both in schematic and picture form. This same drawing is reproduced on a sticker which accompanies every unit, being glued either to the back panel or the under side of the top panel.

SERVICE INSTRUCTIONS

It is seldom necessary to replace a complete wiring harness or to remove it completely from the unit. When it must be done, it is good practice to disconnect only one part at a time, re-connecting that part immediately to the proper wires in the new harness. However, should it be necessary to wire a unit without the old harness as a guide, study carefully the wiring diagram until you have identified the various pairs of wires by their length, color, and grouping; then mount the harness on the unit and make the connections. The time control and the selector switch carry letters showing the proper place to connect each wire as identified by the color-code chart on the diagram. On all other parts, where only two wires are connected, the wires may be connected in either direction, provided their length permits; reversal of the wires makes no difference in the operation of the part.

SECTION IV

SERVICE INSTRUCTIONS

Units Between Serial Nos. 64,000 to 72-B-001

CABINET ASSEMBLY

The cabinet assembly on the Deluxe porcelain Unit of this series is similar in design and appearance to the cabinet on the earlier Unit. Provisions have been made in the front panel to accommodate the later style door which is hinged on the side. A rubber gasket, going all the way around the bead over which the top panel fits, is incorporated as a part of the assembly.

In removing the cabinet assembly it is necessary to remove the rubber top gasket and the time control which now mounts on the front panel.

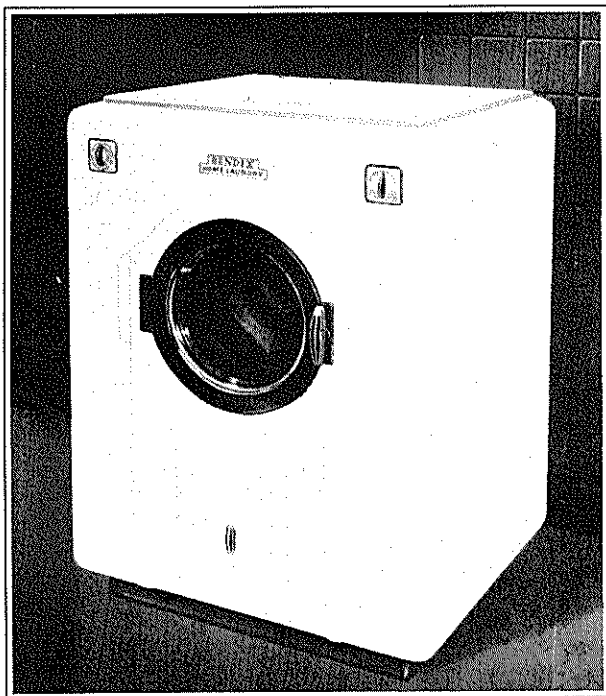


Figure 1
Deluxe Model Bendix Home Laundry

BASE ASSEMBLY

The Base Assembly on the Deluxe Model is provided with louvers which are placed directly beneath the motor assembly to provide air circulation around the motor. The power plant hanger rod at the rear of the base assembly is threaded with $\frac{1}{2}$ "-20 thread one inch in length and by the addition of the two spacing washers and nut, the power plant hanger rubber bushing can be compressed, locking the rubber bushing to the hanger rod. This also locates the power plant in the base.

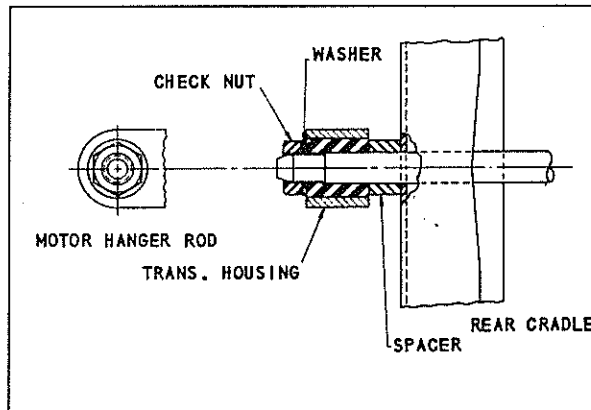


Figure 2
Hanger Rod Locking Assembly

TUB ASSEMBLY

A porcelain enameled tub assembly is incorporated in all Deluxe Model units with serial numbers above 64,000. The porcelain enamel finish is used on both the interior and exterior of the tub.

Provisions are made for mounting the side opening door, and the float tube extends inside the drain sump so as to act as a locating pin for the drain case and screen. The timer mounts on the cabinet front panel.

DRAIN SCREEN AND CASE

The drain screen and case are porcelain enameled and have a $\frac{7}{8}$ -inch diameter hole in the rear which fits over the float connection. In the event that the drain screen becomes clogged due to not being cleaned properly, the water is always

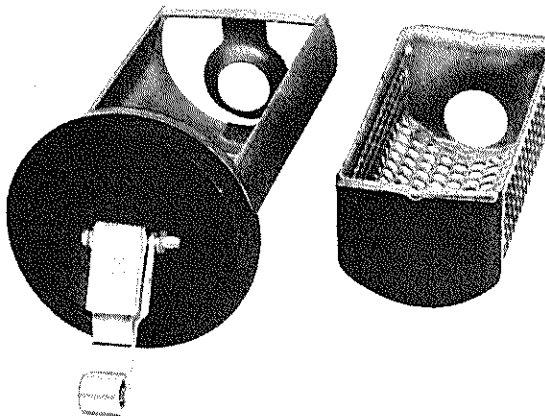


Figure 3
Drain Screen and Case

held in the float chamber so that the float switch remains open, thus preventing the Unit from going into extraction until the water is removed from the tub and the drain screen cleaned.

SPRAY TUBE AND TIP ASSEMBLY

The spray tube is equipped with a slotted nozzle which is soldered to the end of the tube where it passes through the rubber grommet in the tube. The nozzle gives a spray of maximum effectiveness and needs no adjustment as the tube is held firmly in place by the clothes door latch assembly.

To remove the spray tube and nozzle, first remove the clothes door latch and shims and then pull the nozzle out of the rubber grommet in the tub; loosen the tube clamp on the front cradle (Deluxe Model only) and loosen the coupling hose clamp. Remove the spray tube. To install, reverse this procedure.

On the Standard Model the spray tube is nickel plated in order to enhance the appearance of the unit.

CLOTHES DOOR ASSEMBLY

The clothes door is finished in durable porcelain enamel, hinges from the side, is easy to close and is readily adjusted to give a perfect water seal. The hinge pin is an integral part of the door frame and is not removable separately.

Two hinge brackets are used. These brackets are fastened to the tub by cap screws which are threaded into D nuts in the tub assembly. The clothes door catch is mounted in the same manner. To remove the door assembly from the Unit it is only necessary to remove the upper hinge bracket and then by opening the door it can easily be lifted out of the lower hinge bracket. This lower hinge bracket should not be removed unless absolutely necessary as it has been adjusted at the factory so as to center the door perfectly in the clothes door opening. Generally by loosening only one bracket at a time, the original factory setting of the door can be retained. If, however, it becomes necessary to loosen both brackets, the door should be centered carefully by lining up its outside circumference with the raised portion of the tub surrounding the clothes door opening.

Adjustment of the pressure on the clothes door gasket is provided by shims under the hinge brackets and the catch. To add or remove shims it is not necessary to remove the screws, but merely to loosen them as the shims are slotted. In assembling these shims always make sure that the soft shim is placed next to the tub.

A crystal door glass is incorporated in the porcelain clothes door assembly and gives a clear view of the interior of the Unit. This glass is assembled in the door frame in much the same way as it is on the earlier Unit. The snap ring is provided with a hole at the top

into which a small screw driver or punch can be inserted for removal purposes. It is extremely important not to pry against the door frame in performing this operation as the frame is liable to be chipped with rough treatment.

TUB BACK AND BEARING ASSEMBLY

The interior cone of the tub back assembly is finished in porcelain enamel. At Serial No. 1B&S001 the position of the two ball bearings was changed slightly so as to decrease the distance between the front bearing and the cylinder.

In servicing tub back bearings or a cylinder, if it is necessary to replace either of the spacers, care should be taken to see that the new spacer corresponds in size with the old one, so that the proper spacing between the front of the cylinder and the tub is maintained. If the entire tub back must be replaced (this is very seldom necessary) the spacers supplied by the factory with the tub back should be used. For the correct spacer to use with any tub back see your Parts and Price List.

POWER PLANT

The same power unit is used in all Deluxe, Standard and Utility Models. The parts of this assembly are described in the paragraphs following.

THE MOTOR in the power plant for both models has a bearing on the pump end which is a sealed, self-lubricated ball bearing similar to those used in the tub back assembly. The fan on the rotor is designed so as to give an assembly which operates at a lower temperature, and

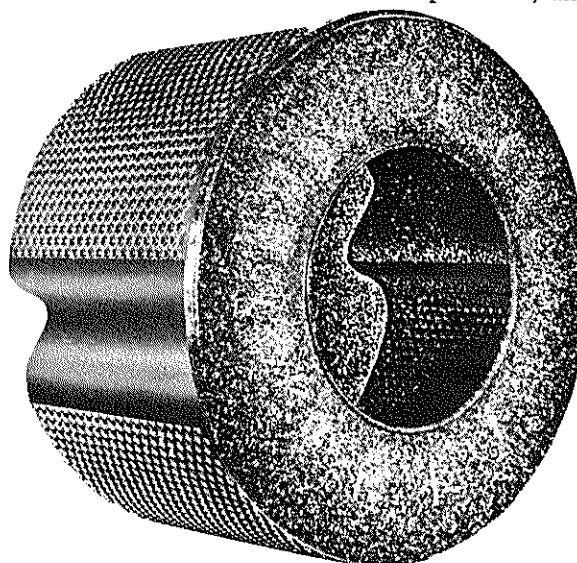


Figure 4
Cylinder Assembly

the overload cut-out or thermotron which is mounted in the motor end bell has proven stability.

THE SEALS in both the pump and transmission housings are of the compression type, and sealing is effected by a metal to metal contact between an oilite ring in the seal body and a hardened and ground steel washer. The seal is made up of two members which are held together by a sirvine boot, the outer member having incorporated in it the oilite ring which serves as one seal face. The members are free to move in a direction parallel to their axis but are interlocked so that they cannot turn with respect to each other. A phosphor bronze spring inserted between the members tends to push them apart, and delivers the pressure which keeps the two seal faces pressed firmly together.

In the transmission, where the seal is used as an oil seal, it is pressed into the transmission housing and faces inward toward the motor, sealing against the steel washer which is pressed on the motor shaft. To remove this seal it is necessary to disassemble the transmission and remove the transmission housing, after which a hooked tool can be inserted through the bronze motor bearing to drive the seal out. A special tool, Part No. ST-148, is available from the factory for inserting the seal in the housing. To insert a seal, first apply a small quantity of Glyptol to the lower seal member and set the seal into the counter-bore in the housing. Then insert the guide pin on the tool through the center of the seal and push down until the spring is completely compressed. Light hammer blows will then drive the seal into place.

In the pump, where the seal is used as a water seal, it is pressed into the pump housing and faces toward the inside of the pump assembly, sealing against the steel washer which is part of the pump impeller. The impeller is held firmly in place, so that the pressure of the seal spring will not displace it, by a cone point set screw which locates in a counter-bore in the motor shaft. To replace a seal in the pump assembly, disassemble the pump and remove the pump housing, after which the procedure is similar to that for the seal in the transmission housing.

In replacing a seal on either end, the condition of the companion steel washer should be carefully noted, and if it is worn or grooved it must also be replaced. The washer on the transmission end is not carried as a Bendix service part as it is part of the motor; therefore, if it must be replaced the motor should be taken to a United Motors service station who are equipped to press on a new washer. The washer on the pump end is part of the pump impeller, and to replace the washer it is best to replace the entire impeller.

The jack shaft seal in the transmission end plate is provided with a slot which allows the oil to drain back into the transmission instead of being held up around the jack shaft where leakage might possibly result when the motor

is stopped. This seal is serviced in the same way as are earlier seals and is interchangeable with them.

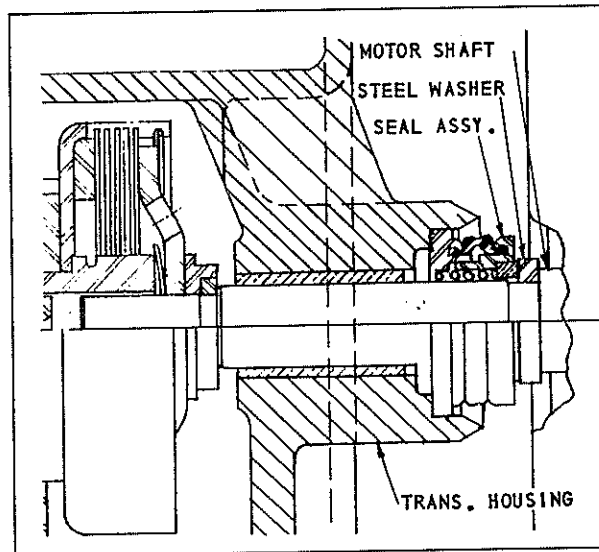


Figure 5
Seal Assembly—Transmission End

THE CLUTCH in the transmission, starting with serial number 23-B-615, has driven plates made from phosphor bronze. The result is a clutch which picks up the load smoothly and quickly, and which tends not to drag to any great degree when in the released position. This clutch assembly is serviced in the same manner as earlier clutches, and the phosphor bronze plates are interchangeable with the present style plates.

THE ADJUSTABLE DRIVE PULLEY on Units with serial numbers above 32-S-601 has been provided with steel shims to control the clearance between its inboard and outboard halves. The shims are of a thickness which causes the addition or removal of one shim to affect the revolutions of the cylinder by one revolution per minute. For example, with the cylinder revolving at 58 R.P.M., the removal of one shim from the pulley will change the R.P.M. to 59. The two halves of the pulley and the shims are locked into a rigid assembly by two ¼-inch cap screws and lockwashers.

THE OIL LEVEL PLUG in the transmission case has been relocated so that with the transmission case filled to a point where oil just runs out the hole the transmission will contain five ounces of oil, the transmission being on a horizontal plane.

THE DRAIN VALVE ASSEMBLY. Draining of water from the tub of the Unit is controlled by a solenoid operated valve which is built into the cover of the drain pump.

The plunger of the valve operates on a horizontal plane and its movement is controlled by a rocker arm which engages the end of the plunger. Attached to the other end of the rocker arm is a solenoid assembly similar to the transmission shifter solenoid, and also attached to the rocker arm is a spring which serves to close the valve when the solenoid releases.

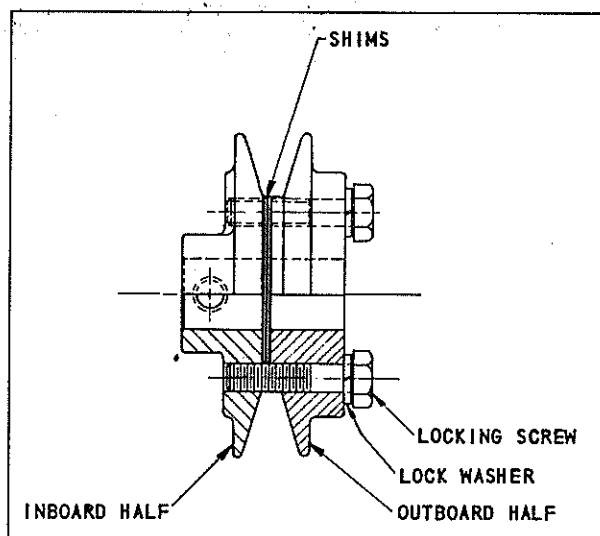


Fig. 6
Adjustable Drive Pulley

A die cast gland serves as a bearing for the drain valve stem and also holds in place, by means of a cup washer, the neoprene diaphragm, or boot, which seals the plunger stem. This gland is held in place by a snap ring.

When the solenoid is energized thus pulling the plunger away from its seat and opening the valve, the portion of the diaphragm which encases the plunger stem moves with the stem and the diaphragm collapses. When the valve closes it returns to its normal shape. As a result of this type of construction there is no necessity for a sliding contact between the plunger and the sealing member, so the possibility of leakage around the plunger stem is eliminated.

To disassemble the drain valve, first remove the solenoid and then remove the following parts in order: rocker arm, spring, snap ring, gland, cup washer, diaphragm, and plunger. To assemble, reverse this procedure.

To remove the pump cover, first remove the solenoid, rocker arm, and spring. Then remove the rocker arm pivot stud and the five pump housing screws. To assemble, reverse this procedure.

TIME CONTROL AND SWITCH

The time control on Deluxe and Standard units with serial numbers above 2-S-719 has six cams, and the shape of the fourth cam has been

altered so as to permit operation with the present inlet valve and thermostat. The shape and position of the motor, shifter solenoid, and drain solenoid cams is the same as that of the corresponding cams in early style timers and their functions are the same. For the connections to the various cam switches reference may be made to the schematic wiring diagram, Page 56. For the functions of the timer during the various periods of the cycle, see the time control chart, Page 57.

On units with serial numbers from 64,000 to 2-S-719 a timer was used which had an auxiliary switch mounted on the side. This switch served the same purpose as the sixth cam in the later timer, and in replacing one of these timers a six cam assembly may be used. To replace an auxiliary switch time control with a six cam time control, connect the wiring harness to the new timer, using the color code markings on the switch block. This will leave the sixth or green receptacle open to receive the long green wire with red tracer which previously connected to the middle terminal on the auxiliary switch. The four short wires and the two three wire connectors are not needed with this hook-up.

The shaft extension on the time control is not removable. Protection against injury to the clock mechanism due to counterclockwise rotation is afforded by a plunger and spring arrangement in the knob which forms a ratchet that slips when the knob is turned backward. When clockwise rotation is resumed the ratchet automatically engages the shaft at the point to which it had been advanced before the backward rotation was started. When installing the knob, it is not necessary to set it for any definite position as it will engage the shaft at the proper point.

The time control on Deluxe units mounts on the cabinet front panel and is locked in place by a screw through a bracket on the front panel. To remove the timer, remove the knob, the top panel, and the wing screw which fastens the front panel to the left side panel. Remove the screw on the side, turn the timer in a clockwise direction and remove, first removing the plug-in connectors. To install, reverse this procedure. Removal procedure for the Standard Model timer is given on Page 68.

SELECTOR SWITCH

The Selector switch on Deluxe and Standard Models is of the single pole double throw type. It is constructed so that the knob travels through a sixty degree arc in going from one position to the other and operates with a definite "click" or snap. On Units above 1-S-800, identifying letters are stamped into the selector switch cover to show where the wires are to be connected. On Units below that serial number, reference should be made to the wiring diagram sticker for the correct position of the wires.

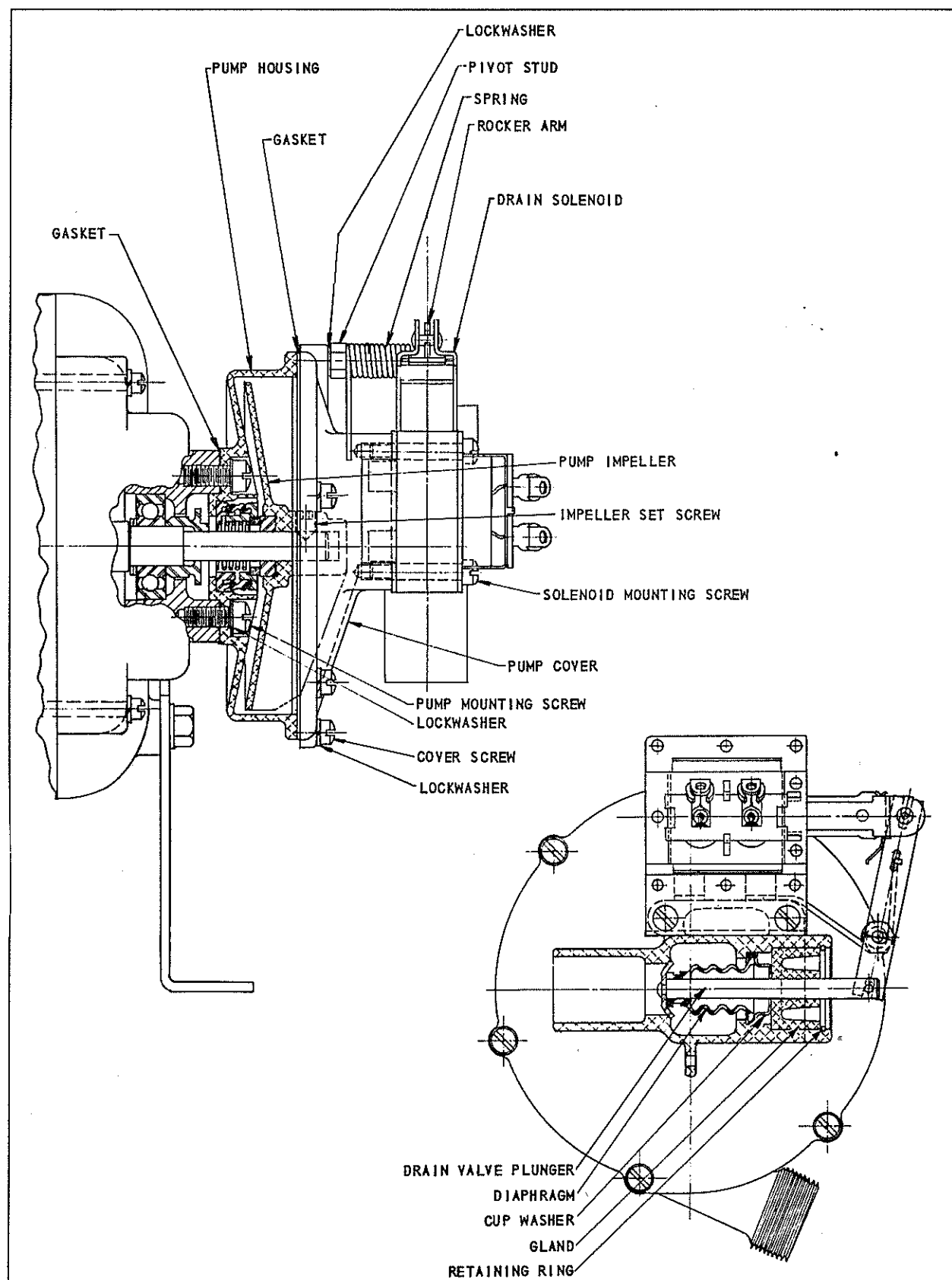


Figure 7
Drain Pump and Drain Valve Assembly

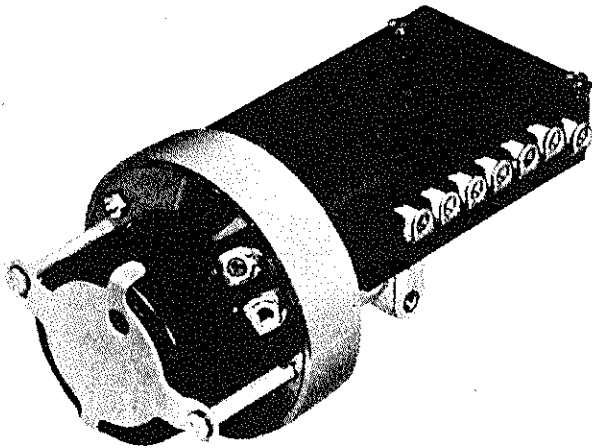


Figure 8
Time Control and Switch Assembly

INLET VALVE ASSEMBLY

The inlet valve assembly is similar in its construction and operation to the valve described in Section VI. However, dual plungers are used on both hot and cold sides of the valve, and the orifice sizes are changed. The method of mounting is altered somewhat, and the outlet of the valve body is equipped with a left hand thread to accommodate the flare-nut on the dual thermostat.

At serial number 22-B-301 the boss on the inlet valve body which holds the valve to the mounting bracket was removed. In its place a U shaped stamping is used, this stamping acting as a brace between the mounting bracket and the bracket on the solenoid cover. In servicing a unit under serial number 22-B-301 with one of these late style inlet valves the stamping, part No. 10120, must be used and should be ordered as needed from the factory as it is not included with the valve.

THERMOSTAT ASSEMBLY

A dual thermostat assembly is used, one thermostat being in the hot water inlet valve circuit and the other in the cold water inlet valve circuit.

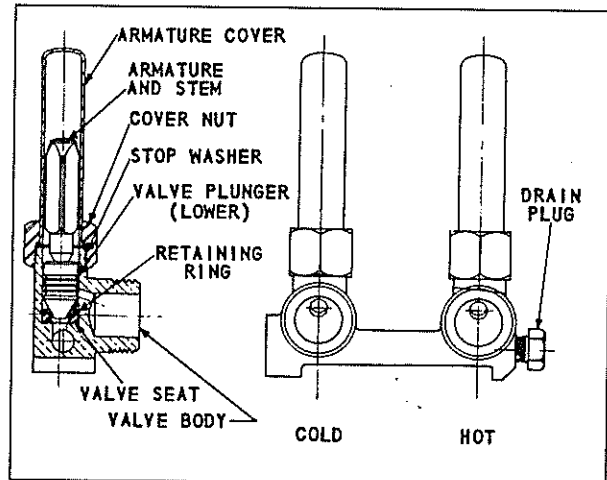


Figure 9
The Inlet Valve Assembly

cuit. The temperature of the lukewarm water under normal conditions is maintained at the proper point by the hot water thermostat (the one nearest the inlet valve assembly), and the cold water thermostat acts as a safeguard to prevent the lukewarm temperature from dropping too low in case the water in the supply tank is not hot enough to give a mix within the range of the hot water thermostat.

In order to assure proper operation of the inlet valves it is important that a fixed difference in settings of at least 10 degrees be maintained between the two thermostats. The correct temperature settings are given in the instructions following.

The flare nut (also called tube nut) which fastens the dual thermostat to the inlet valve body has a left hand thread. To remove the thermostat, turn the flare nut clockwise. To install it, turn the flare nut counterclockwise.

To adjust the hot water thermostat:

1. Open shut-off valves.
2. Short out each thermostat with a small jumper wire.

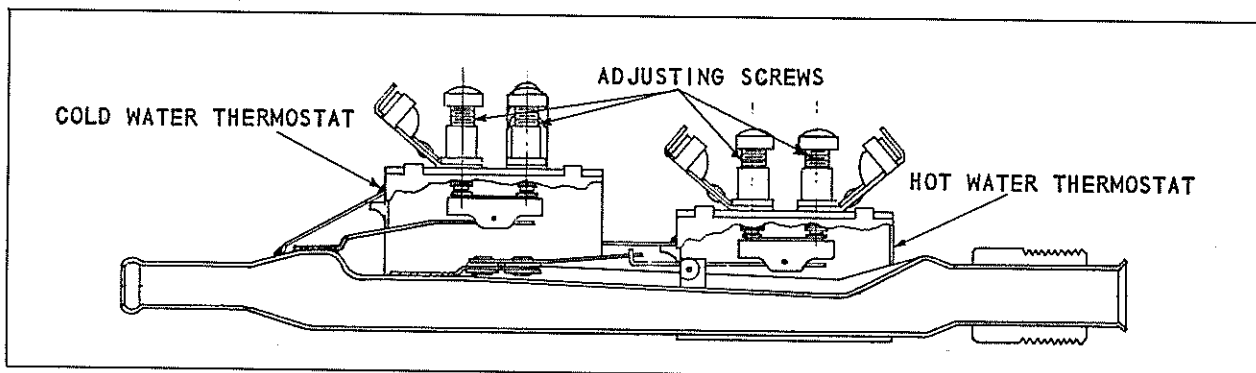
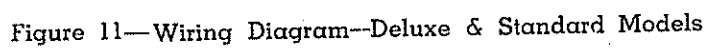


Figure 10
The Dual Thermostat Assembly



3. Check temperature of water entering tub at spray tube.
4. If water temperature does not exceed 120 degrees F. turn cold water shut-off valve until water temperature reads 120 degrees.
5. Remove jumper from hot water thermostat and adjust until water temperature reads 102-106 degrees F.

Turn adjusting screws down by equal amounts to increase water temperature and up to decrease water temperature.

To adjust the cold water thermostat:

1. Open shut-off valves.
2. Short out each thermostat with a small jumper wire.
3. Check temperature of water entering tub at spray tube. If water temperature is above 85 degrees F., turn hot water shut-off valve until water temperature reads approximately 85 degrees F.
4. Remove jumper from cold thermostat and turn adjusting screws by equal amounts until water temperature reads 92-94 degrees F. Turn adjusting screws down to decrease temperature and up to increase.

Note: It is essential that the hot water supply be at least 130 degrees F. if this procedure is to be employed successfully.

When the adjustment has been finished, make sure that the jumper wires are removed from both thermostats and the shut-off valves turned on full. If the combined temperatures of the incoming hot and cold water are within the range of the setting of the hot and cold water thermostats no valve operation will be noted as the lukewarm temperature will be between 92 and 106.

The Standard Model Bendix Home Laundry in this series is mechanically the same unit as the DeLuxe Model, and service on it is, for the most part exactly the same. The chief points of difference between the DeLuxe and Standard Models lie in the appearance. A cabinet is not used on the Standard, but the moving parts are all completely enclosed by two small side panels on the base and a back panel assembly. The time control and the selector switch are mounted on a control panel which is in turn mounted on the tub back by four self tapping screws.

TUB ASSEMBLY

The tub on the Standard Unit in addition to the over all ground coat of porcelain enamel, has a coat of white enamel on the exterior. The

FLOAT ASSEMBLY

The float on porcelain units is similar in its construction to and interchangeable with the float on early units. The float, float chamber, and float tube are all finished in porcelain enamel.

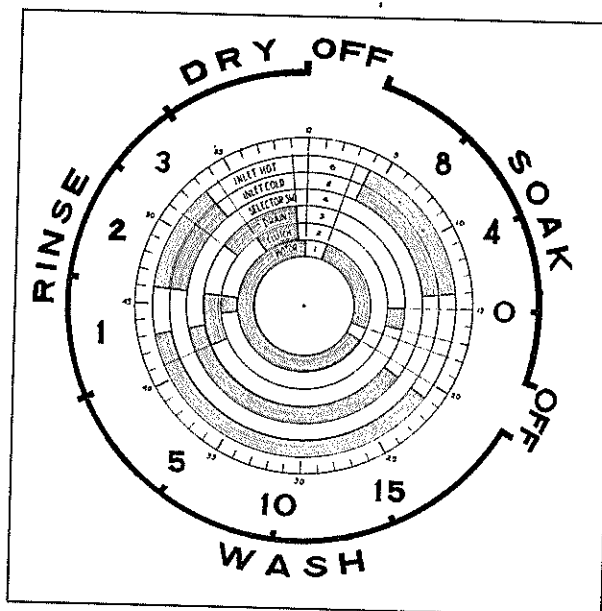


Figure 12
Time Control Chart

Shaded Sections Represent Time Control Contacts Made for Various Parts of the Cycle.

OPERATION OF THE UNIT

The sequence of events of various parts of the cycle in the unit are the same as those given on Page 89 of Section VII. Reference to the Time Control Chart, Fig. 13, will show that the numbers 5 and 6 cam switches make contact in the soak period, numbers 4 and 6 make contact for the wash and first rinse periods, and numbers 5 and 6 again make contact for the last two rinse periods.

MODEL S UNIT

tub mounting straps, the tub back clamp ring, and the spray tube are all nickel plated. Moulded rubber covers are provided for the latch and hinge brackets. There are no stops used in the hinge brackets as the covers act as stops, thus allowing the door to be swung back out of the way and yet preventing any possibility of its striking the tub.

SOAP DOOR ASSEMBLY

The soap door assembly is made up of two pieces. A moulded rubber cap fits over the lip of the soap door opening and conforms to the curvature of the tub. A moulded plastic door hinges in the rubber cap and can be raised to allow soap to be poured into the tub. The name "Bendix Home Laundry" is molded into the door

and the letters are filled with white enamel. This door is provided with a vent hole at the rear which opens into a recess in the rubber cap at the back, thus allowing a free movement of air as the unit fills and drains.

To remove the soap door, bend the rubber cap aside so that the hinge pins have enough clearance to be lifted out. To remove the rubber cap, first remove the soap door grill and the cap can then be lifted out. To assemble, reverse this procedure.

Some Standard Model units employed a stainless steel soap door which was mounted by means of a clamp ring and screw. To remove this type of door it is only necessary to loosen the clamp screw and lift off the door. After this has been done the soap gasket and the grill can also be removed.

THE PANELS

To remove the back panel and cowl assembly, remove the four screws, two near the top and one on each side near the bottom, using a part No. ST 147 Phillips screw driver. To remove either of the side panels, first remove the back panel; then loosen the nuts on the threaded ends of the tub mounting straps and remove the screws at the bottom of the panels.

THE BASE ASSEMBLY

The Standard Model base assembly is very similar in construction to the DeLuxe Model base, the main point of difference lying in the construction of the front cradle. This cradle is provided with small doors which can be removed for service and installation purposes by means of small latches at the top. To operate the latch insert a screw driver into the slot and turn the latch in either direction about one half turn. This permits the top of the door to be pulled forward so that the door can be lifted out.

Each door is provided with a rubber gasket to insulate it from the cradle so as to prevent rattle and prevent scratching the finish of the front cradle when removing or inserting.

The base assembly carries the unit serial number plate which is mounted on the left side near the front corner and just below the edge of the left side panel.

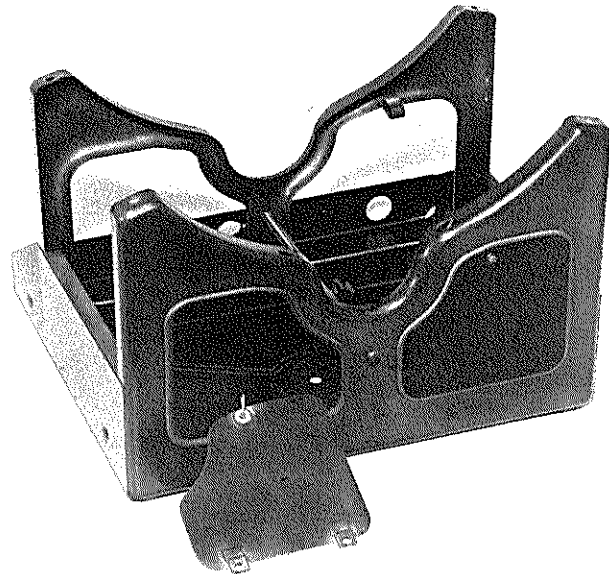


Figure 13
Standard Model Base Assembly

CONTROL PANEL ASSEMBLY

The control panel can be removed as a unit when servicing the tub back, or the time control and selector switch can be serviced separately. To remove the entire panel, first remove the back panel; then disconnect the wiring harness from the time control and the selector switch and remove the four screws in the control panel brackets. To remove the time control alone, remove the knob by removing the set screw, spring and plunger, and remove the screw which fastens the time control body to the bracket on the control panel. Disconnect the wiring harness and turn the timer in a clockwise direction (looking at it from the bottom) until free and remove.

The selector switch is removed from the control panel in the same manner that it is removed from the front panel on the DeLuxe Model.

SECTION V

DIAL-O-MATIC MODEL K AND M UNITS

The Dial-O-Matic unit washes with essentially the same principle as the Automatic unit, but without the automatic features.

The Model K is provided with an inlet hose assembly which is assembled to the tub in the same manner as the Model M, however, this hose assembly is not interchangeable on the two units.

The Model K inlet tube fitting where it enters the grommet has a shorter radius to provide clearance for the porcelain top. The inlet hose passes through the back panel, either in the upper right or left hand corner, depending on which of the two outlet holes provided in the back for the hose to pass through is nearest the water supply.

On the Model M Dial-O-Matic unit a grommet is provided between the soap door and rear of tub where a nozzle is inserted for filling.

In the top of the back panel assembly on the Standard Model M Dial-O-Matic, the space is occupied by a control switch with a knob and dial, which shows the operation for which the unit is set. On the DeLuxe Dial-O-Matic Model K the same switch is located on the upper left hand corner of the front panel.

This control switch has four positions to correspond with OFF, WASH, DRAIN, and DRY. With the switch in the extreme left or OFF position all circuits are broken. When the switch is advanced clockwise or to the right, the following cycle is completed manually:—

Switch Position	Circuits Completed
Off	None
Wash	Motor
Drain	Motor and Drain Solenoid
Dry	Motor, Drain and Shifter Solenoids

The extreme right on DRY position is provided with a stop which prevents the knob from being turned beyond that point. To stop the unit from any position, it is necessary to turn the knob counterclockwise or to the left as far as it will go.

All parts on both Dial-O-Matic Models, except those mentioned in the following paragraphs, are serviced in the same way as the corresponding parts on the Automatic Model, and for service instruction, reference should be made to Section III of this book. For interchangeability of certain major parts, refer to the parts and price list.

CONTROL SWITCH

To remove the control switch from the Model K Deluxe unit, first remove the top panel as explained on Page 66 of Section VI in this book. Next, remove the knob and then remove the wires from the control switch, and screws holding the switch to the panel assembly.

The Model M Standard Dial-O-Matic control switch is removed by taking the four screws out of the back panel assembly, tilting it backwards slightly, and removing the knob, two nuts and lock washers.

MARK TIME CLOCK

A Mark Time Clock is used on the Model K Deluxe Dial-O-Matic only, and is mounted in the upper righthand corner of the front panel, facing the unit. The purpose of this clock is to signal the operator when any part of the cycle has been completed by ringing a bell. The Mark Timer is set by turning the knob in a clockwise direction for the desired time. If less than five minutes is desired, the knob must be turned at least to the five minute mark and then turned in a counterclockwise direction for the number of minutes desired. This winds the clock motor. The Mark Timer does not perform other than the above noted function.

To remove the Mark Time Clock, follow essentially the same directions and instructions as given for the control switch removal on the Deluxe Model Dial-O-Matic unit.

In reconnecting the wiring harness on both models, follow the letters which are stamped into the cover of the control switch designating the color of wire to be plugged into each terminal.

WIRING HARNESS

The Utility Model wiring harness differs from the harness used on the Automatic Models in that no outside braid or covering is used around the wires. When a connection becomes defective it is only necessary to change that individual wire instead of the complete harness. For the function of the various wires see the wiring diagram, Page 60 or the sticker on the unit back panel.

DOOR GLASS

The door glass is provided with three marks numbered 1, 2, and 3 and at distances of one, two, and three inches respectively above the bottom of the glass. These marks serve as locating points for gauging the water level, and their use is covered fully in the operating instructions, Page 63.

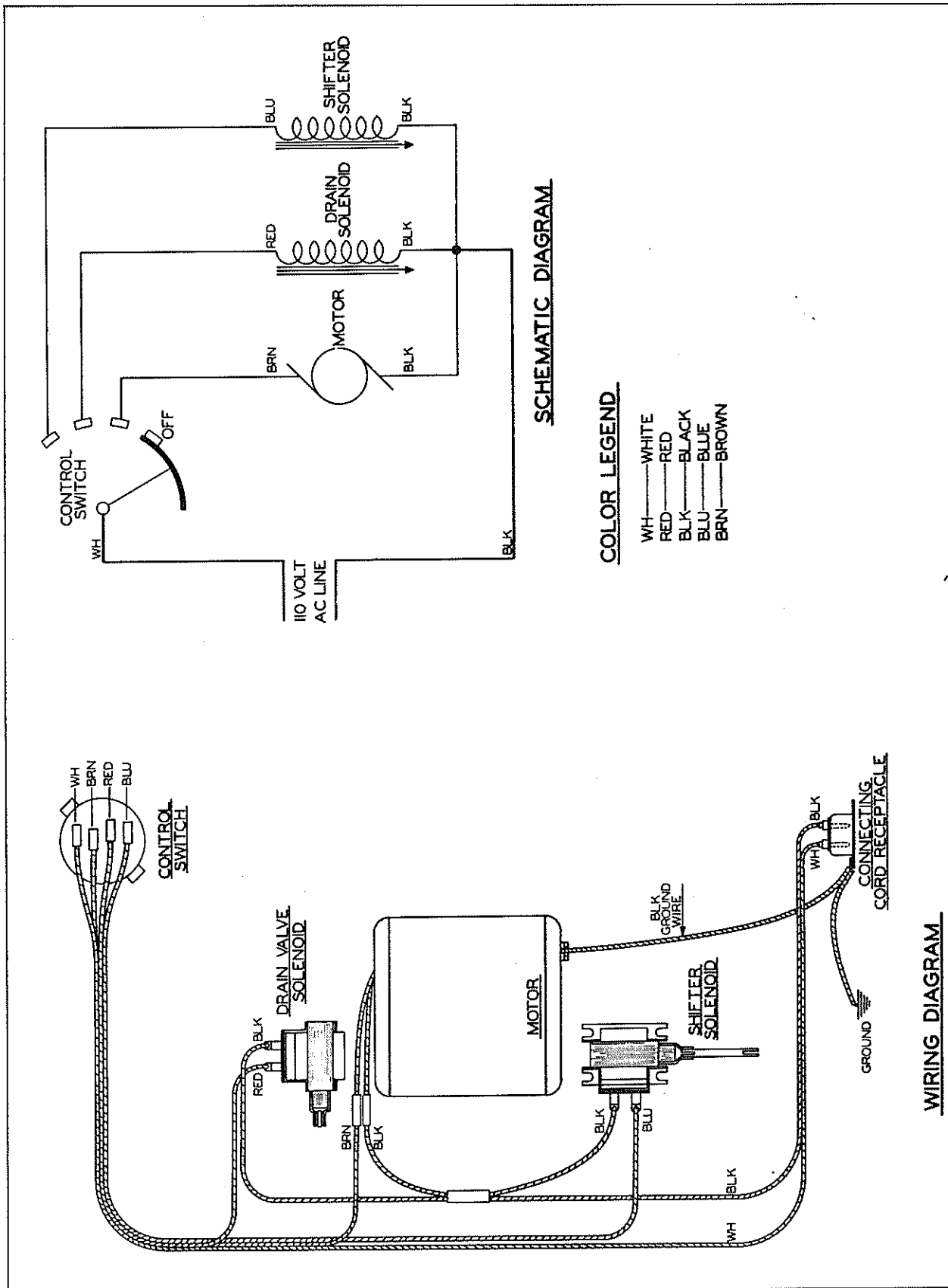


Figure 1 — Wiring Diagram — Utility Model

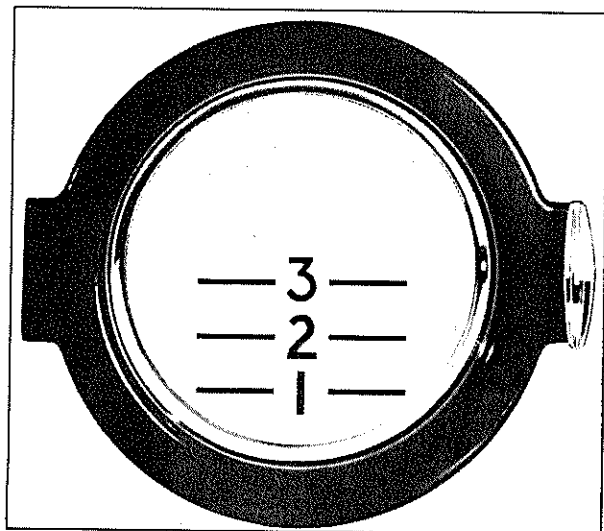


Figure 2
Clothes Door — Utility Model

FILLER TUBE

The filler tube on the inlet hose is made of comparatively thin metal so that it will respond readily to changes in temperature of the water passing through it. This makes it possible for the operator to gauge the water temperature quite accurately by placing her hand on the tube as the unit is filling.

Because of this thin construction it is important that the tube be pushed down into the grommet as far as it will go before being turned into position. If turned before being pushed all the way down the tube is liable to be collapsed so that the flow of water is greatly restricted. Customers should be cautioned on this point.

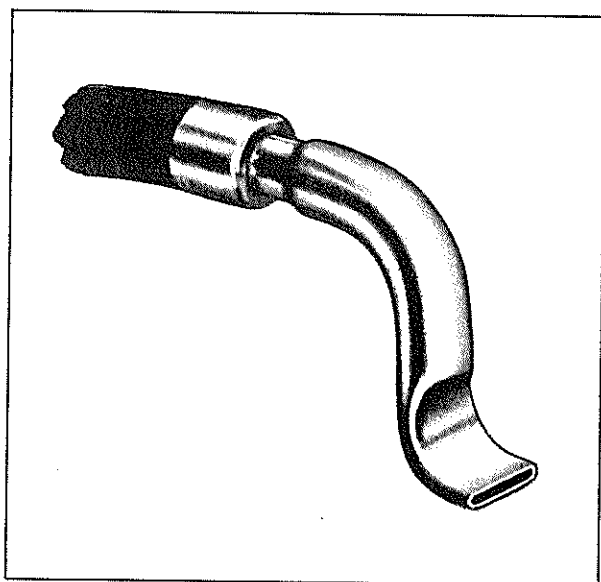


Figure 3
Filler Tube

INSTALLATION OF DIAL-O-MATIC MODEL

To those familiar with the installation of the Automatic Models, the installation of the Dial Model should not be difficult, as the basic requirements for a workmanlike and economical installation are the same. The same attention should be given to water supply, power supply, and flooring as is outlined in Section I of this book. This should be studied and followed closely, with exception to the steps covering the actual installation, a guide for which is given below.

TO INSTALL DIAL-O-MATIC:

1. Remove packing case by removing the ten screws that fasten the case to the wood base.
2. On the Model K Deluxe Dial-O-Matic remove panels for installation as given in Section III of this book.
3. On the Model K Standard Dial-O-Matic remove the back panel and set to one side and also the front panels by turning the panel latches 90 degrees right or left with a screw driver.
4. Remove filler hose and accessory bag from unit.
5. Install the leveling legs and lock-nuts. Turn the lock-nuts down toward the head of the leveling legs as far as they will go, and screw the legs all the way in, but do not tighten.
6. Remove the pipe plug from the top of the transmission case, and in its place install the breather tube or pipe from the bag of accessories. At the same time, remove the shipping block and hold-down wire from the motor and install the belt.
7. The oil level in the transmission should be checked at this time by removing the oil level plug in the transmission cover plate. The oil should come just to the bottom of the hole.
8. Move the unit into place and install the mounting bolts by screwing them into the anchorage which has been previously provided (See Pages 3 to 5 of Section I), leaving them loose. Level the unit with the leveling legs and lock the legs with the lock-nuts. Tighten the mounting bolts.
9. Install the drain hose assembly.
10. Connect the ground wire from the base of the unit to a good ground, such as a cold water pipe. Both mechanical connections should be cleaned to insure good electrical contact. **THIS GROUND WIRE MUST BE ATTACHED ON ALL INSTALLATIONS.**

11. Connect the filler hose to the mixing valve or swivel faucet and insert the filler tube into the rubber grommet on the tub. (Be sure and push the tube all the way down before turning into position.)
12. Plug in the power supply cord, and by turning the control switch slowly through all four positions make sure that the motor and drain and shifter solenoids are operating properly.
13. Return the switch to "Off," open the soap door and fill the unit with lukewarm water to the No. 1 mark on the door, using the water tempering instructions for mixing valve or swivel faucet as the case may be. This serves also as a check on the water tempering device used.
14. Turn the control switch to "Drain" and allow the unit to run until completely drained. Then turn to "Dry" for a few seconds in order to remove all the water from the cylinder, and return the switch to "Off."
15. Replace panels. Remove the filler tube from the unit and lay it in the set tub or on the floor.

INSTRUCTING THE OWNER

Before leaving the home the owner should be instructed on cleaning the drain screen, operating the control switch and the mixing valve, and inserting and removing the filler tube. The actual demonstration of the unit will usually be handled by someone experienced in such work.

THE MIXING VALVE

In order to make the task of tempering water as easy and simple as possible Bendix has made available a valve (See Page 64) which serves the dual function of tempering the water and controlling the water flow and yet can be operated with one hand. Thus one of the operator's hands is left free to gauge the temperature of the water by grasping the filler tube on the inlet hose.

A rather unique design has been incorporated into this valve in order to minimize the effect so frequently associated with other mixing valves—that is a great change in the temperature of the mixed water due to a drop in pressure in either the hot or cold water line. Actually, this assembly incorporates two valves whose outlets connect to a common port. They are of the plunger type and are actuated by the under edge of the temperature control knob which is brought to bear on the plungers by the action of the shut-off lever.

A riser is molded into the under edge of the control knob so that as the knob is turned the valves are opened by amounts corresponding to

the knob setting, thus giving a mix of the desired temperature. Arrows stamped into the knob show the operator the proper direction to turn it for an increase or decrease of temperature. If all hot or all cold water is desired the knob can be turned as far as it will go in the proper direction and throwing the shut-off lever over will then open only one of the valves.

Another unique feature of the mixing valve is the fact that it can be used in any position and with any piping arrangement. The valve when shipped from the factory is set so that the knob indicators read correctly with the valve mounted with the outlet port down, the hot water pipe is connected to the left hand inlet port, and the cold water pipe is connected to the right hand inlet port. Any deviation from this arrangement may necessitate rotating the knob 180 degrees so that it reads correctly. To do this, rotate the knob to the end of its travel in either direction, depress the plunger against which the stop then rests with a screw driver and turn the stop on past the plunger.

To check the setting, turn the knob so that all cold or all hot water is indicated by the pointer, throw the shut-off lever, and observe by grasping the filler tube whether or not the water which flows is of a temperature corresponding to the setting of the knob.

The extreme versatility of the mixing valve makes it suitable for replacement of the swivel faucet with no sacrifice of convenience when water is needed for other purposes.

Given on the next page are illustrations of some typical mixing valve installations. It will be noted that a kit of parts is available under No. SK-424 which makes possible the installation of the mixing valve when it is desired to connect it to existing outlets rather than to plumb it permanently into the lines.

CAUTION: When a mixing valve is plumbed into the pipe lines, make sure that all burrs are removed from the pipes which are left by the cutting and threading operation and that the pipes are flushed thoroughly to remove all shavings and chips. If this precaution is not observed, the chips may become lodged under the valve seats cutting them and causing the valve to leak.

OPERATION OF DIAL-O-MATIC MODEL

Every Bendix Service man should be thoroughly familiar with the operation of the Dial-O-Matic Model as well as the Automatic Models. Study carefully the operating instructions reproduced below, and go through a washing a few times yourself. When questions come up for which you do not have the answer, consult Section VII, ask your home demonstrator, or go through some of the many valuable booklets that your sales organization has on the subject of washing in a Bendix Home Laundry.



Figure 4
Dial-O-Matic Model Dial

OPERATING INSTRUCTIONS

To Obtain Best Results, Carefully Study Your Bendix Home Laundry Manual

FOLLOW INSTRUCTIONS INDICATED BELOW:

- A Rinse cylinder by running water into the Unit with switch knob set at WASH position, at the same time tempering water for the first operation (see special instructions for type of mixing valve you are using). When correct temperature has been obtained, turn water off. Set switch knob at DRAIN. When empty, stop Unit.
- B Temperature of the water is controlled entirely by the operator.
- C Place clothes in Unit and close the door.
- D Water level positions for guiding the operator are marked on the glass of the door. If a full load of dry clothes is placed in the Bendix, water should be run into the Unit until it reaches the No. 3 position. Subsequent fills for the same load of clothes should be to the No. 2 position. Less than full loads may require smaller quantities of water but it is advisable, even with the smallest load, to fill at least to the No. 1 position.

TO SOAK CLOTHES

1. FILL Unit with neutral (lukewarm) water, keeping soap door open.
2. TURN switch knob to WASH and add soap to bring suds to the correct level. Close the soap door. If softener is used, add it before the soap.
3. SOAK for approximately 10 MINUTES, MAINTAINING the correct suds level.

4. SET switch knob to DRAIN. After completely draining, turn knob to DRY for two minutes, then stop the Unit. This completes the soak cycle.

TO WASH CLOTHES

1. FILL Unit with water of the correct temperature, keeping soap door open.
2. Turn switch knob to WASH and add soap. Close the soap door. If softener is used, add first. If bluing is used we recommend La France which should be put in just before the soap.
3. After proper suds level has been obtained, allow clothes to wash time needed (depending upon the amount of soil, usually 10 minutes). Maintain the correct suds level.
4. Turn switch knob to DRAIN. After completely draining, turn knob to DRY for two minutes, then stop the Unit. This removes most of the soapy water before rinsing.

FIRST RINSE

1. For first rinse, fill to No. 2 position on glass door. Use water of same temperature that you used in the wash cycle, keeping soap door open.
2. Turn switch knob to WASH position and close soap door. Rinse for five minutes.
3. Turn switch knob to DRAIN. After completely draining, turn knob to DRY for two minutes, then stop the Unit.

SECOND RINSE

1. Repeat No. 1 and 2 under first rinse using neutral water.
- (NOTE: You may rinse as many times as you like. Generally two rinses are adequate.)

TO DAMP DRY

1. Now drain the unit completely. Then turn switch knob to DRY position and allow to run for five minutes.
2. After damp drying, turn switch knob to DRAIN and allow Unit to tumble clothes for a minute.

When washing is completed, rinse Unit with switch knob set at WASH. After rinsing, turn switch knob to DRAIN. When fully drained, turn to DRY, then STOP. Remove and clean out the drain screen.

RECOMMENDED WATER TEMPERATURES

Use hot water in wash cycle for cottons and linens. Use neutral water throughout for delicate fabrics.

SUDS LEVEL

COLOR FAST COTTONS AND LINENS—For soaking, suds should be from half way to three quarters of the way up on the glass door. For washing, medium suds, just above half way on the glass door should be used.

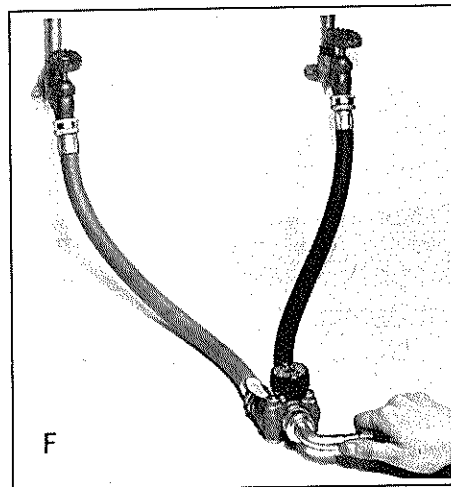
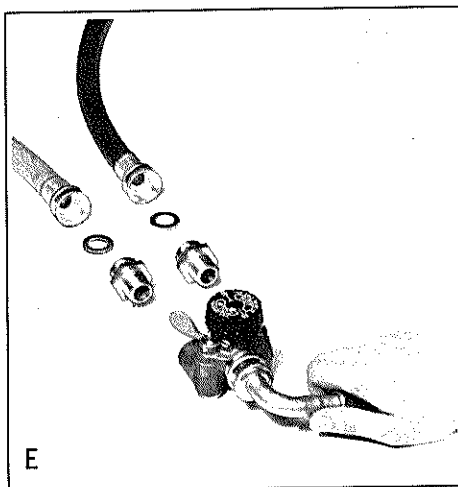
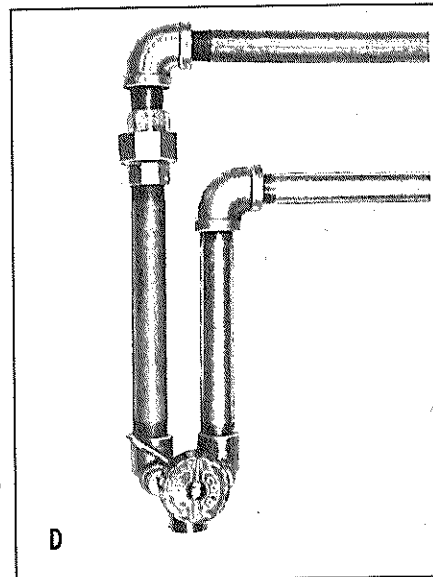
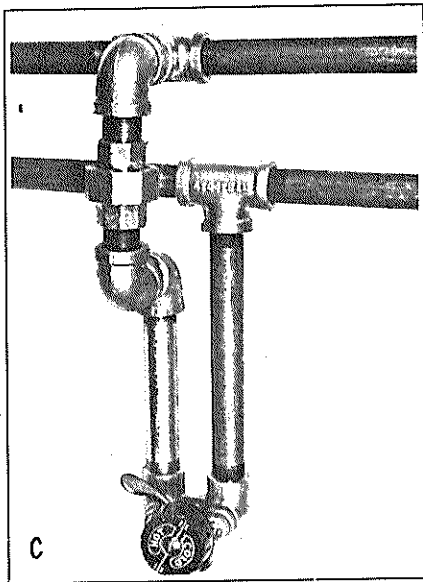
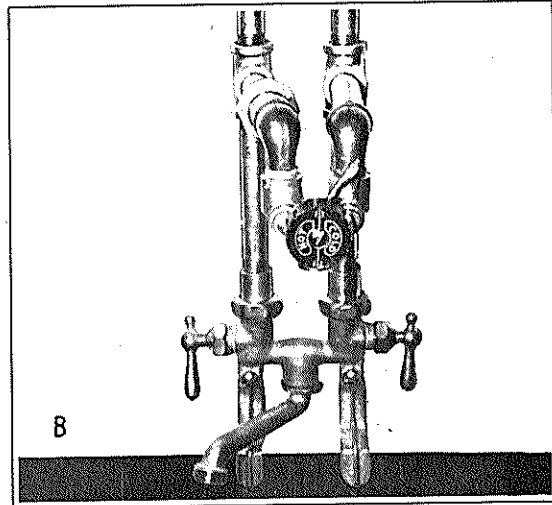
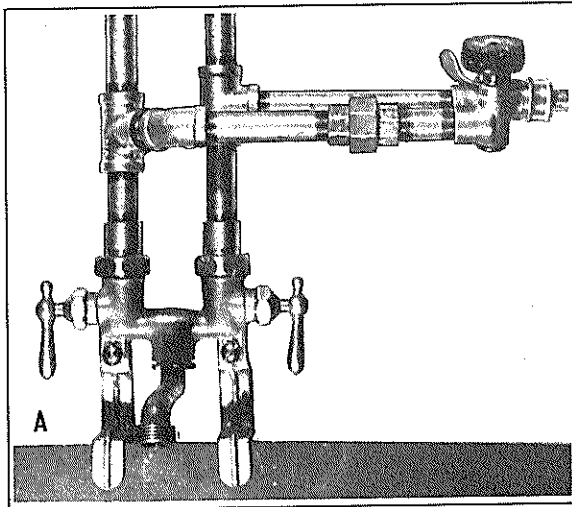


Fig. 5—Some Typical Mixing Valve Installations
Views A, B, C, and D show valve plumbed directly into hot and cold water lines.
Views E and F illustrate use of valve with SK 424 hose and fittings kit.

DELICATE FABRICS—High suds to the top of the glass door should be used in washing delicate fabrics.

INSTRUCTIONS FOR OPERATING MIXING VALVE

The knob adjusts the water temperature. For hot water, turn in the direction of the hot arrow as far as the stop allows. For cold water, turn in the direction of the cold arrow as far as the stop allows. For neutral (lukewarm) water, rotate the knob from COLD in the direction of HOT until the proper temperature is reached. After a little experience you will find this position easily.

The LEVER behind the knob shuts off the water completely and turns it on completely. Always turn the lever to the full OFF or full ON position, otherwise the neutral temperature setting will vary from one fill to another.

The metal TUBE at either end of the inlet hose permits you, by holding your hand on it, to adjust the temperature of the water without getting your hands wet. The water will be neutral when the tube feels neither warm nor

cool. A slight turn of the knob will instantly raise or lower the temperature of the water.

INSTRUCTIONS FOR OBTAINING BEST RESULTS IF SWING SPOUT IS USED

When filling the Unit with neutral (lukewarm) water open both hot and cold water valves simultaneously to approximately the correct position to avoid excessive flow of either very hot or very cold water onto the clothes.

The TUBE to which the hose is attached permits you to determine the correctness of neutral temperature without getting your hands wet. Adjust the temperature until the tube feels neutral to the hand—neither warm nor cool.

The approximate neutral position can be found during the draining of the tepid water from the pipes. With the cold valve wide open, open the hot valve until the tube feels neutral to the touch. Should the temperature of the hot water be relatively low, you may need to open the hot valve fully and partially close the cold valve. Remember this approximate position so you can start neutral fillings quickly and easily.

ADDITIONAL OPERATING HINTS

SOAK . . .

You can soak clothes, in the Bendix Home Laundry, for any length of time you wish. Ten minutes usually gives excellent results. On some fabrics a soaking operation is not necessary.

DRAIN . . .

Set to DRAIN. The clothes will still continue tumbling while the Unit is draining. Continue until the flow of water stops. You can observe this if the water is being drained into a set tub, or hear it if being drained into a drain pipe. If you are not sure, let it drain a few moments extra before proceeding with the next operation.

If after draining, suds still cover the face of the door (which may happen if too much soap is used) stop the Unit for a moment to let the clothes and suds settle; reset Unit to WASH and run in some more water of the same temperature as just previously used, until the suds have been pulled down. Shut off water and reset to DRAIN. This will avoid a soapy rinse and the overflow of suds during the extraction operation.

EXTRACTION . . .

After the Soak, Wash and First Rinse, when the draining is completed, set to DRY. The cylinder will speed up and whirl the water out of the clothes, draining the Unit at the same time. Allow this to continue for about two minutes, or until the steady stream from the drain hose stops. This removes the used water from the clothes with which they have been saturated.

DAMP-DRY . . .

This is the same as the extraction operation, which should be continued longer to remove as much water from the clothes as possible. About five minutes is recommended.

Another way is to extract for a short period of time; reset to WASH until the clothes have tumbled into a new pattern and extract again. This rearranges the clothes and removes additional water.

UNLOAD . . .

Always allow the cylinder to come to a stop before unloading the Unit.

FLUSH . . .

At the end of the complete washing, the Unit should be flushed. Set to WASH and fill with neutral water until you can see it splashing in the cylinder. Shut off the water; drain the Unit; and then extract for about a minute. Stop the Unit and remove the Drain Screen Case and

CLEAN THE DRAIN SCREEN. TEMPERATURES . . .

Use neutral (lukewarm) water for the soak and last rinse. For normal cottons and linens use hot water for the wash and the first rinse. For delicate fabrics (silks, rayons and woolens) or special colors, use neutral water for all operations.

When filling with neutral water, keep temperature uniform. Do not add hot and cold water alternately.

SECTION VI

SERVICE INSTRUCTIONS

Units between Serial Nos. 500 to 64,000

TOP ASSEMBLY

Removal:

1. Press top forward by placing left hand at back edge.
2. Lift front edge with right hand and remove top.

Disassembly:

1. Remove soap door by removing the two nuts and washers from the under side of top.

Assembly:

1. Replace soap door making sure that cushioning washers are in place.

Installation:

1. Place back edge of top panel over spring tabs in back panel and line top panel up with flanges on side panels.
2. Press top panel forward with left hand, pressing down on front edge until front edge drops into place and release.

CAUTION: The top panel is easily removed by hand, and no tools need be employed. Failure to learn the correct method of removal and attempting to take the panel off by prying under the edges invariably results in chipped porcelain. Porcelain enamel is as brittle as glass and will chip if subjected to sharp blows or severe bending stress. Screws should never be pulled down too tightly when fastened to porcelain enamel and cushioning washers should always be used under the head of the screws and under the nuts.

NOTE: If the top does not slide forward easily when pressure is applied at the back, the unit may be of earlier production when a slightly different method of securing the top panel was employed. If such is the case, the removal procedure will be as follows:

1. Press in on the back panel with both hands, each hand being about seven inches in from the sides and at the same time lifting the back edge of the top panel with the fingers.
2. Slide top panel forward slightly and remove.

CABINET BACK ASSEMBLY

Removal:

1. Remove top panel.
2. Remove four cap screws which hold top flange of back panel to side panels.

3. Remove two wing screws from back panel.

4. Lift back panel and remove.

Installation:

1. Set bottom edge of back panel inside back flange of base assembly.
2. Replace the wing screws using a drift punch in the holes provided to line up the back and side panels.
3. Replace four cap screws at top of back panel.

NOTE: On units below serial number 26,640 the four screws at the top were not used. To remove this panel simply take out the two screws which fasten the back panel to the cabinet, lift the panel and remove, noting carefully the position of the five tabs near the bottom which help hold the panel in place. To install, guide the five tabs into the proper position and replace the two screws.

SELECTOR SWITCH

Removal:

1. Loosen set screw in knob and remove knob.
2. Remove top panel.
3. Disconnect wiring harness from switch by pulling out plug-in connectors.
4. Remove nuts and lock washers which hold switch bracket to screws in front panel.
5. Lift out switch.

Installation:

1. Reverse operations 5 to 1.

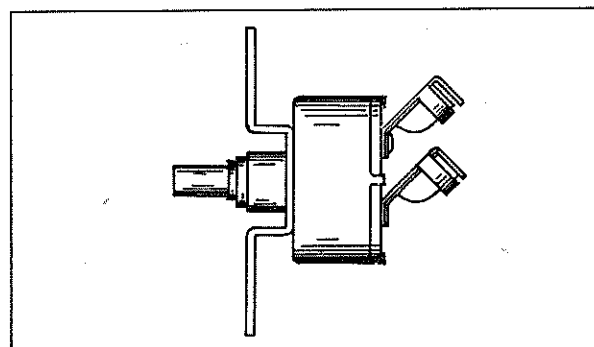


Figure 1—Selector Switch

NOTE: On units below serial number 32,000, the selector switch is mounted to a bracket on the tub by a single nut. To remove this switch, remove the knob and top panel and perform all

other operations necessary to allow the cabinet front panel to be moved forward enough to give access to the switch mounting nut. Unsolder the wiring harness from the switch and remove the mounting nut. The switch may then be lifted out. To install, reverse this procedure.

CABINET

Removal:

1. Remove top and back panels.
2. Remove Selector Switch.
3. Remove time control knob by backing off shaft extension.
4. Remove wing screw which fastens right side panel to front panel through bracket on tub. (A large screw driver facilitates this operation.)

5. Remove cap screws and washers which fasten base of right side panel to base assembly and remove panel.
6. Remove wing screw which fastens left side panel to front panel.
7. Remove left side panel by taking out screws at base. (The front panel must be supported during this operation so that it cannot fall away from unit.)
8. Remove front panel by removing screws at base.

Disassembly:

1. Remove drain door from front panel by lifting out hinge pins and unhooking spring.
2. Remove dial plates by prying up tabs which secure them to front panel and sliding tabs through holes.

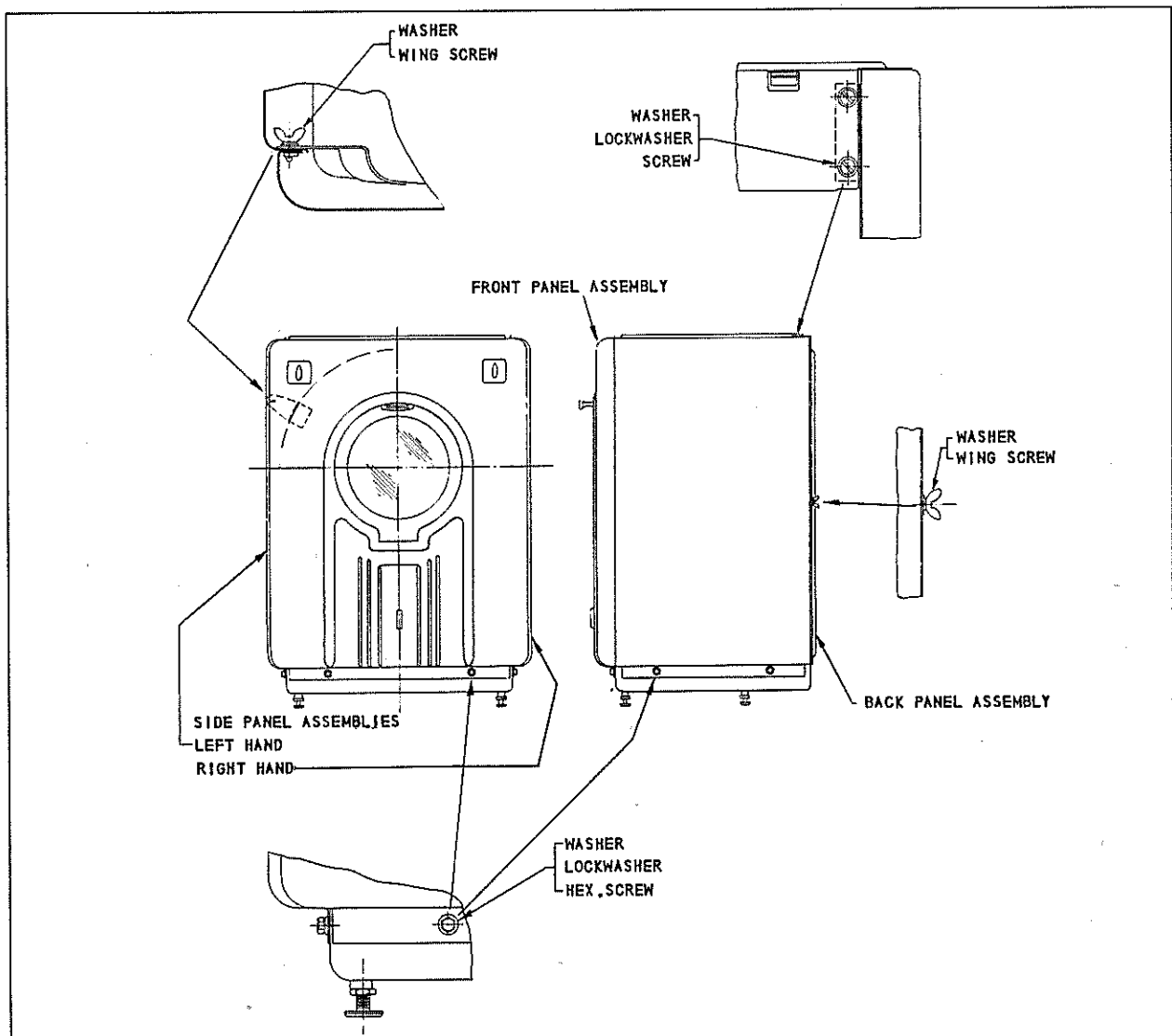


Figure 2—Three Piece Cabinet

NOTE ON DIAL PLATES: When a dial plate is being changed, it should be compared to the plate already on the machine. If they are not similar in finish, both plates should be changed so that the front panel will have a uniform appearance.

Assembly:

1. Install dial plates by pushing tabs through the holes in the panel and bending tabs down flat.

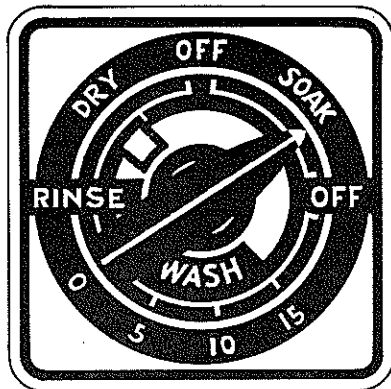


Figure 3 — Dial Plates

2. Install drain door by lining up hinges and putting hinge pins in place. Install spring by hooking end in slot provided and other end around hinge bracket.

Installation:

1. Reverse operations 8 to 1 under "Removal."

NOTE ON FRONT PANEL: When the front panel is installed it must be centered so that the space is uniform around the clothes door and so that the clothes door hinge is in the middle of its opening.

NOTE ON ONE PIECE CABINET: To remove the one piece cabinet first remove the top panel and back assembly. Remove the time control knob, the selector switch knob, the screws at the base of the front panel, and the bolts which secure the side panel brackets to the brackets on the tub. If screws and cup washers are used on the side, loosen them also. The cabinet may now be removed by sliding it forward. To install the one piece cabinet reverse this procedure.

CLOTHES DOOR

Removal:

1. Remove cabinet front panel.
2. Remove two headless screws which fasten clothes door to hinge pin, and remove two headless screws which pass through hinge pin bracket on tub and into hinge pin.
3. Remove hinge pin and lift off door.

Disassembly:

1. Remove handle by removing screw which passes through clothes door latch and into handle body.
2. Remove snap ring by inserting screw driver between ring and door body at the flat provided in one end of the ring.
3. Lift out glass and gasket.
4. Remove sealing gasket on inside of door.

Assembly:

1. Reverse disassembly operations 4 to 1.

NOTE ON SNAP RING: To insert the snap ring start one end in the ring groove at the top and hold it there with one hand while with the other hand you compress the ring and force it into the groove. (Use cardboard under ring to prevent scratching of paint on door.)

Installation:

1. Line up the bottom of the clothes door with the hinge pin bracket and install the pin.
2. Install the four headless screws into the hinge pin.

NOTE ON HINGE PIN: There is a right and wrong way that the hinge pin can be installed. If installed the wrong way the screw holes cannot be lined up. To determine the right way, hold the pin so that, with the threaded part of the inner set of holes pointing down, the threaded part of the outer set of holes is turned toward you. Install the pin in that position.

TIME CONTROL AND SWITCH ASSEMBLY

Removal:

1. Remove knob by backing off shaft extension.
2. Remove top panel.
3. Unhook wiring harness from switch by pulling out plug-in connectors.

4. Remove bolts and nuts which fasten time control bracket to bracket on tub and lift out time control.
5. Remove time control bracket by removing three nuts which fasten bracket to time control body.

Disassembly:

Do not disassemble the time control; if it is defective return it to the factory.

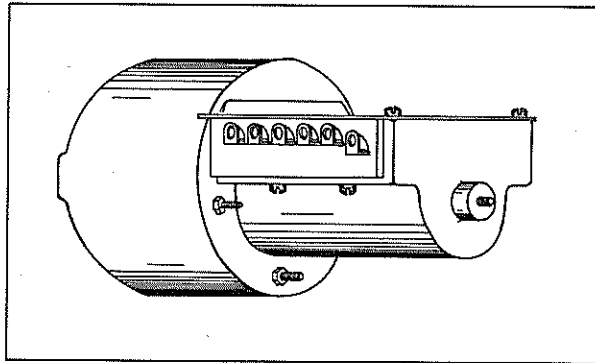


Figure 4—Time Control and Switch Assembly

Installation:

1. Reverse removal operations 5 to 1.

Adjustment:

1. Loosen nuts on the two bolts which hold the time control bracket to the bracket on the tub.
2. Remove time control bracket in slots provided until shaft centers in hole in front panel.
3. Tighten mounting bolt nuts.

NOTE ON WIRING HARNESS: Care should be taken in replacing the plug-in tips of the wiring harness that the wires are inserted in the proper sockets. Letters are embossed on the terminal block which correspond to the color legend given on the wiring harness chart.

NOTE ON THE EARLY TIME CONTROLS: On early production, no adjustment was provided on the time control and the wires were soldered to the terminals. In order to remove the control it is necessary to move the front panel of the cabinet forward far enough to provide access to the time control mounting nuts and to unsolder the wires at the terminals.

FLOAT ASSEMBLY

NOTE: Practically all parts of the float assembly can be serviced without removing the assembly from the Unit. It should seldom be necessary to remove it.

Removal:

1. Remove top panel, back panel, and cabinet.
2. Loosen hose clamp near bottom of float chamber and disconnect hose.

3. Unhook wiring harness from float switch by pulling out plug-in connectors.
4. Remove two screws, nuts and lock washers which fasten float chamber bracket to cradle.

Disassembly:

1. Remove float switch by removing top ferrule on float wire and screws and nuts which fasten switch to its bracket.
2. Lift off float chamber cover and lift out float.

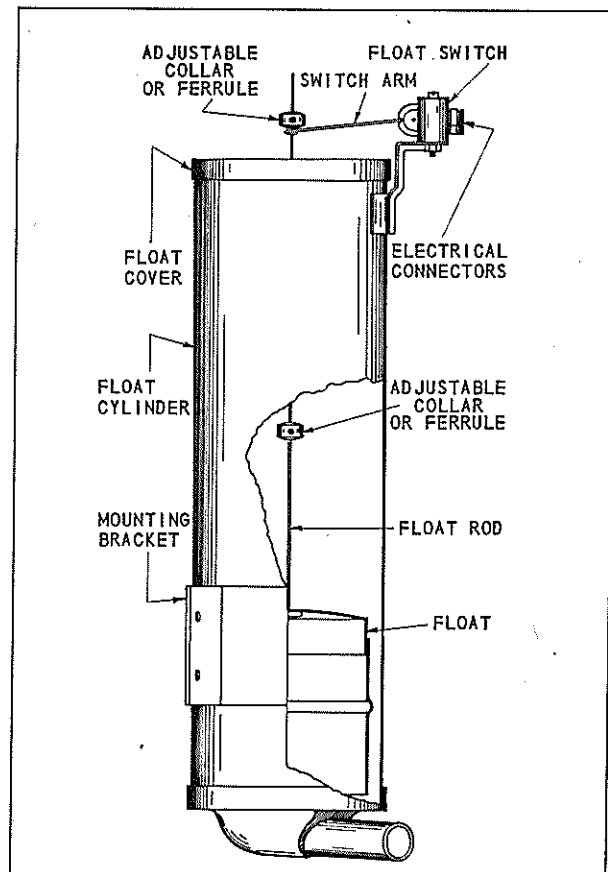


Figure 5—Float Assembly

Assembly:

1. Reverse steps 1 and 2 under "Disassembly."

Installation:

1. Reverse steps 4 to 2 under "Removal."

Adjustment:

1. Locate top ferrule on float wire so that float is just off the bottom of the float chamber when there is no water in the tub. Float should not rest on bottom of float chamber at any time, and float switch should not close until water in tub has cleared cylinder.

2. Locate bottom ferrule so that float switch opens when correct water level has been reached in tub— $\frac{1}{4}$ " below lip of clothes door opening.

NOTE ON EARLY FLOAT ASSEMBLIES:

On early production, the float chamber was mounted to the chassis of the unit by a clamp bracket and was smaller in diameter than the present float chamber. To remove this assembly, disconnect the hose at the bottom, take out the bolts which fasten the mounting bracket to the cradle, and unsolder the wires to the float switch. Adjustment is made by loosening the clamp bracket around the float chamber and moving the chamber up or down to secure the correct water level. If service parts are needed for these early assemblies, the entire float and float switch assembly should be replaced with the new type. In replacing the small float assembly with the large float assembly, the metal tube which connects the chamber to the tub must also be replaced with the new type shorter tube so as to prevent kinking of the hose.

SPRAY TUBE

Removal:

1. Remove top panel, back panel, and cabinet.
2. Loosen hose clamp and disconnect hose from spray tube.
3. Take out bolt which holds tube clamp to front cradle.
4. Work spray tube into tub far enough to insert a pointed tool and round out end of tube.
5. Remove spray tube.

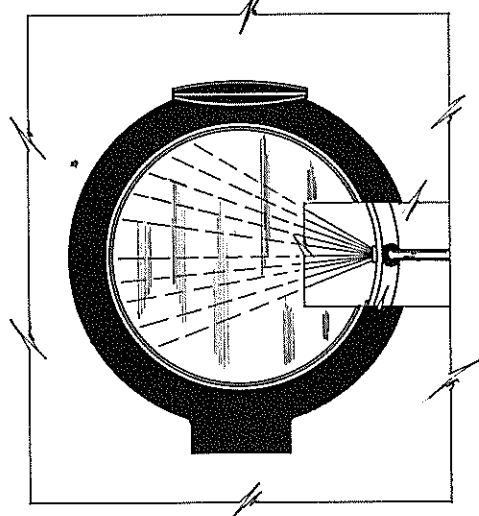


Figure 6—Cut-Away Showing Spray Tube

Installation:

1. Push nozzle end of tube through grommet in tub and on into tub three inches or more.

2. Adjust nozzle by squeezing with pliers until opening is about the thickness of a half dollar. (The size of the opening will vary, depending on the water pressure. See note.)
3. Work tube out into proper position and attach clamp to cradle.
4. Attach hose.

NOTE ON ADJUSTMENT: The end of the spray tube should be adjusted so that the spray is vertical, has a fan shape, and is fairly uniform all the way across. The spray should strike the far corner of the cylinder where the wrapper joins the back. With clothes door closed, check spray for clearance between cylinder and tub at point of entry. If not clear, adjust.

MIXING CHAMBER

Removal:

1. Remove top panel, back panel, and cabinet.
2. Disconnect hoses, one at top and one at bottom.
3. Remove three bolts which fasten mounting brackets to chassis.
4. Lift out mixing chamber.

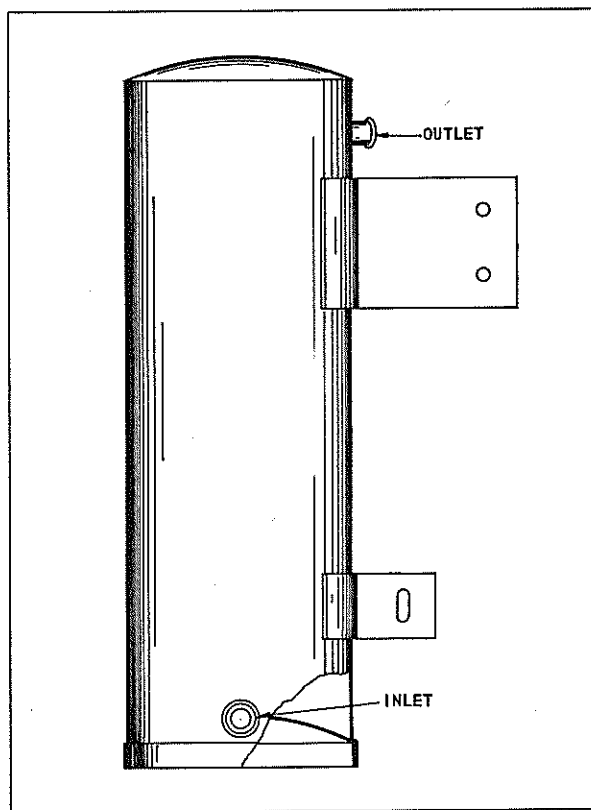


Figure 7—Mixing Chamber

Installation:

1. Reverse steps 4 to 2.

NOTE ON EARLY MIXING CHAMBER:

On early production a small mixing chamber that mounted to the chassis with a single bracket was used. In case service is required it should be replaced with the new assembly. A kit for this purpose is available under part number SK-402. To make the change over, proceed as follows:

1. Shorten the old inlet hose to 6½ inches and attach it to the inlet (bottom) connection on the new mixing chamber.
2. Attach the top bracket of the new mixing chamber where the old bracket fastened to the cradle.
3. Use the bottom bracket as a template to locate its mounting hole on the base assembly.
4. Drill the hole with a $\frac{13}{64}$ inch drill.

5. Attach the bottom bracket with the 10-32 screw, nut and lockwasher provided.
6. Attach inlet hose to thermostat.
7. Cut 5⅝ inches off the spray tube.
8. Connect the outlet of the mixing chamber to the spray tube with the new hose provided.

CYLINDER ASSEMBLY

Removal:

1. Remove top panel, back panel, and cabinet.
2. Remove belt.
3. Loosen rear tub mounting strap. (This prevents undue strain on the tub when the tub back is removed.)

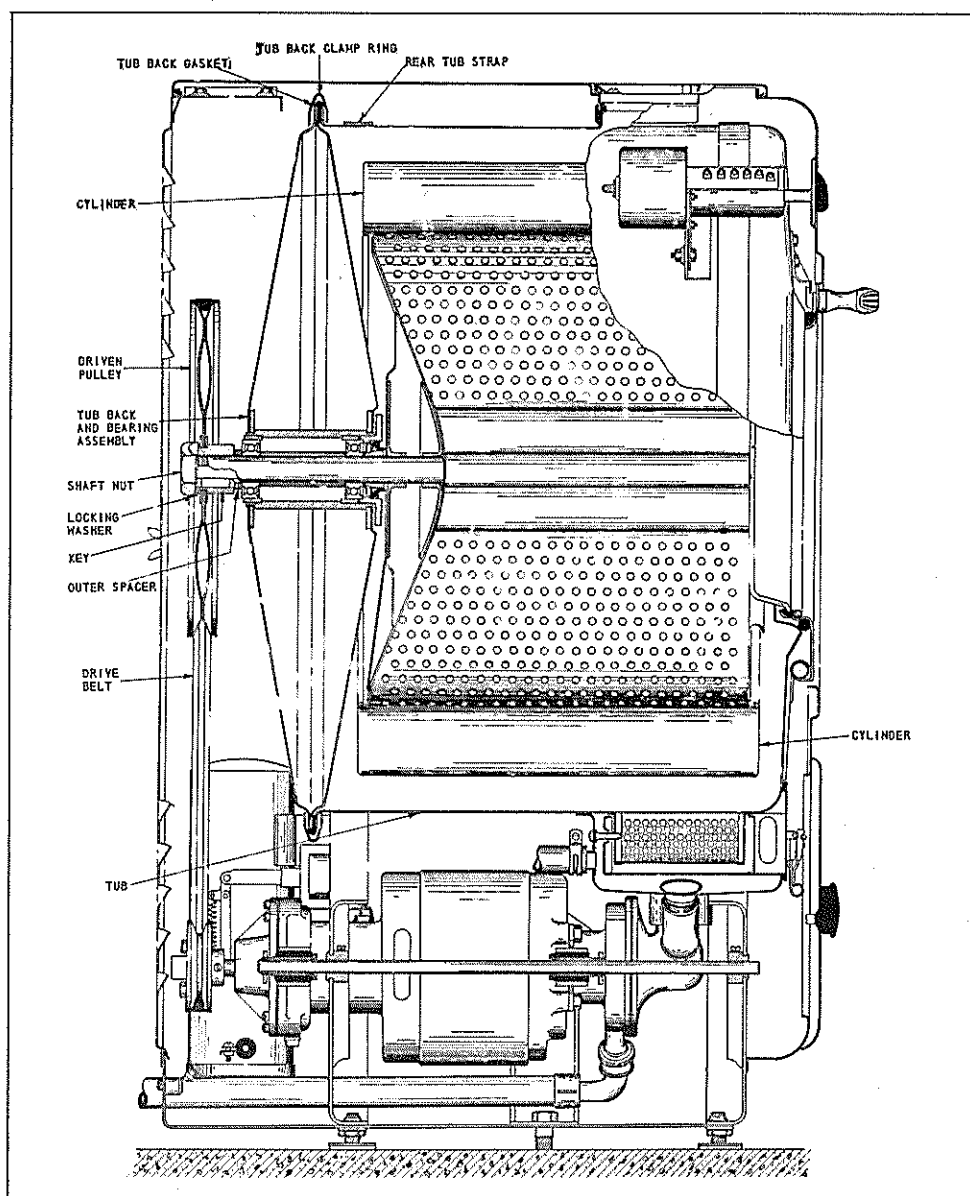


Figure 8—Cross Section View Showing Cylinder and Tub Back Assemblies

4. Lay unit over on front. (Provide box or some support to prevent injury to clothes door handle.)
5. Remove float assembly.
6. Remove tub back clamp ring.
7. Lift out tub back and cylinder assembly observing how gasket is assembled.
8. Remove pulley by flattening out locking washer and removing shaft nut. (See note.)
9. Remove outer bearing spacer and shaft key.
10. Lift off tub back.
11. Remove inner bearing spacer and zinc washer underneath it.

Installation:

1. Assemble tub back to cylinder by reversing steps 11 through 7.
2. Set tub back and cylinder assembly into tub so that hole in edge, at the back, coincides with hole at top of flange on tub.
3. Install gasket. (See note.)
4. Reverse steps 6, 5 and 4.
5. Tighten rear tub strap. (See note under "Tub Assembly.")
6. Install belt.

NOTE ON INSTALLING TUB BACK GASKET: Start one end of the rubber gasket between the tub and tub back near the hole at the top and with the bead on the gasket turned toward the tub back. Place a screw driver between the two flanges and turn it slightly so as to pry the two apart, at the same time working the gasket into place. Keep the screw driver just a little ahead of the gasket at all times, lifting the tub back just enough so that the gasket may be pushed into place. If a new gasket is being used, it will probably be found to be too long when you have worked all the way around the tub. If such is the case, cut off the excess portion leaving the gasket just long enough so that the ends join comfortably at the top.

NOTE ON CYLINDERS: On earlier production, the cylinder shaft was grooved for a Woodruff key instead of the straight key now used, and a cotter key was used to keep the nut from turning. If a cylinder of this type is being replaced with a new cylinder the new key and locking washer must be used. These are sent with every new #97828 service cylinder shipped from the factory.

NOTE ON EARLY PULLEY: The driven pulleys used on early production were equipped with an Allen set screw which tightened against a flat on the shaft. If inspection shows a set screw in the pulley to be removed, loosen it with an Allen set screw wrench (Part No. ST-121).

TUB BACK AND BEARING ASSEMBLY

Removal:

1. Follow removal procedure given under "The Cylinder Assembly."

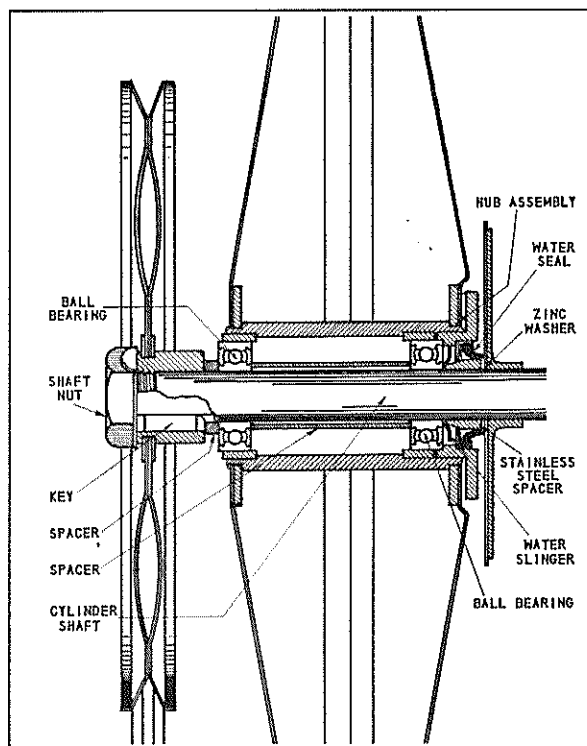


Figure 9—Tub Back

Disassembly:

1. Remove pressure plate by removing screws which hold it to tub back.
2. Remove pressure plate gasket.
3. Remove bearing assembly.
4. Remove steel bearing spacer.
5. Remove water seal.
6. Remove slinger.
7. Remove bearing assembly.

Assembly:

1. Reverse steps 7 to 1 under "Disassembly."

Installation:

1. Follow installation procedure under "The Cylinder Assembly."

NOTE ON EARLY TUB BACKS: In case the tub back and bearing assembly on units below serial number 32,000 must be serviced the entire assembly should be replaced with a new part No. 98198 tub back. It should be ordered in kit form under Part No. SK-401 as this kit includes the necessary spacers to go with it.

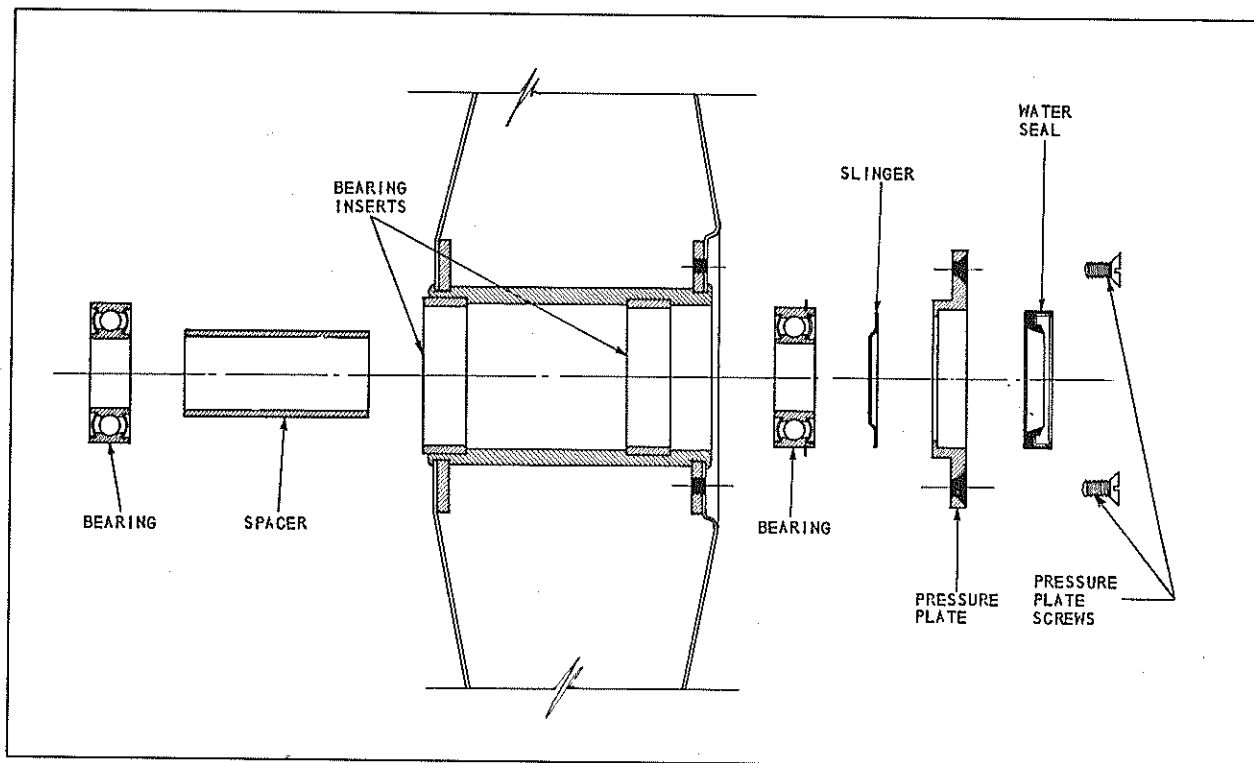


Figure 10—Parts of the Tub Back Assembly

TUB ASSEMBLY

Removal:

1. Remove the top panel, back panel and cabinet assembly.
2. Remove time control and switch assembly.
3. Loosen float chamber connection at drain sump and remove float assembly.
4. Remove cylinder and tub back assembly. (See steps 2, 3, 4, 6 and 7 of the removal procedure under the "Cylinder Assembly.")
5. Return unit to upright position.
6. Remove both tub mounting straps.
7. Loosen drain pump connecting hose at the drain sump.
8. Remove spray tube.
9. Lift tub from base.

Disassembly:

1. Remove soap door gasket.
2. Remove clothes door. (See "The Clothes Door.")
3. Remove Drain screen and case. (See "The Drain Screen and Case.")
4. Remove clothes door catch. (See "The Clothes Door Catch.")
5. Remove wire bail which holds drain case by springing ends apart.

Assembly:

1. Reverse steps 5 to 1 under "Disassembly."

Installation:

1. Set tub on base with dowels in holes provided for them in front cradle.
2. Install tub straps. (See note.)
3. Reverse steps 8, 7, 5, 4, 3, and 2 under Removal.

NOTE ON TUB MOUNTING: When the front panel of the cabinet is installed it may be necessary to loosen the tub straps and rotate the tub slightly so as to align the clothes door with the clothes door opening. The locating holes in the cradle are slotted for this reason.

NOTE ON TUB STRAPS: In tightening the tub straps pull them down just tightly enough that the tub is held firmly in place, but not so tightly that the straps twist to any great degree.

NOTE ON EARLY TUBS: If the unit on which the tub is to be replaced is one with a serial number below 32,000 the new tub should be ordered under Part No. SK-405. This kit includes a #98029 tub, an adjustable time control bracket, screws, nuts, and lockwashers for mounting the timer bracket, 4 strips of insulation (for use where insulation is not provided on the base assembly) and four cabinet centering bracket gaskets. The 98029 tub is adaptable to any of the units under serial number 32,000. On units below serial number 20,640 the cabinet

and tub gaskets which fit around the clothes door opening in the cabinet should be removed as the centering bracket gaskets take their place.

DRAIN SCREEN AND CASE

Removal:

1. Lift drain case handle, thus releasing wire bail which holds assembly in place.
2. Lift bail and pull out drain screen and case assembly.

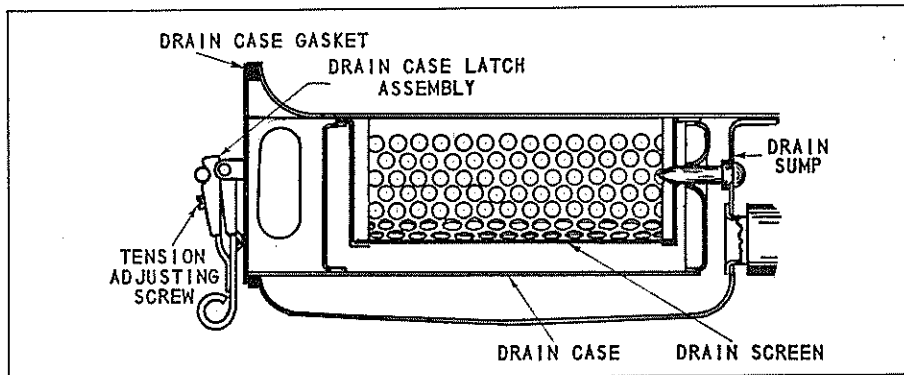


Figure 11—Drain Screen and Case

Disassembly:

1. Lift out drain screen.
2. Remove hinge pin and remove handle.
3. Remove gasket.

Assembly:

1. Replace gasket making sure that the thick part goes to the inside.
2. Replace handle.
3. Replace drain screen with hole toward back.

Installation:

1. Lift bail and guide case straight into the opening so that pin in rear of drain sump goes into hole provided in back of screen and case assembly.
2. Lift handle into horizontal position and allow bail to drop into groove in handle. Push handle down until tension in bail takes hold and keeps handle down.

Adjustment:

If gasket does not seal case, turn adjusting screw clockwise until seal is obtained. Do not turn farther than necessary.

NOTE ON EARLY DRAIN SCREENS: On units below 20,640 the drain screen was made of screen wire instead of the perforated steel now used. Instead of the toggle lock now used the front flange was equipped with a curved handle which was notched to receive the wire bail. When service is necessary, assemblies of

this type should always be replaced with the new drain screen, part #97050, and drain case, part #97051.

CLOTHES DOOR LATCH

Removal:

1. Remove top panel and front panel assembly.
2. Remove the three cap screws holding latch to tub.

3. Remove latch and shims.

Installation:

1. Assemble shims and latch and bolt to tub making sure that the stainless steel cap screw goes on top.

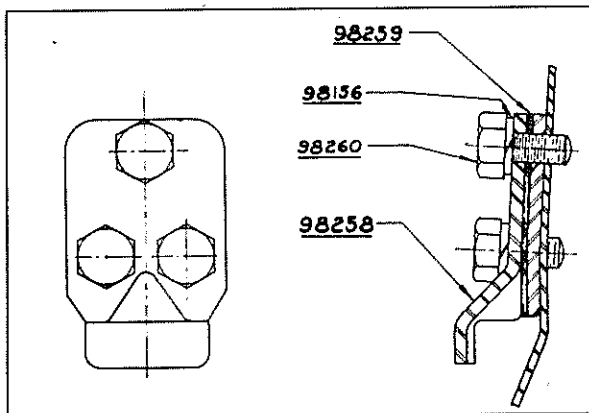


Figure 12—Service Clothes Door Latch

NOTE: The stainless steel screw may be distinguished from the other two by the fact that its head is machined flat across the top and is not plated, while the other two are plated and have a number stamped on the flat part of the head.

Adjustment:

1. Remove latch and remove one shim.
2. Replace latch and test for seal. If door does not seal, repeat operation 1.

NOTE ON SERVICE LATCH ASSEMBLY:
On units below 32,000, the latch was welded to the tub and no adjustment was possible. In case the door does not seal it will be necessary to replace the latch with a new service latch assembly, part #98189.

To do this, proceed as follows:

1. Saw off old latch flush with the pad and file smooth.
2. Scribe a vertical line through center of pad.
3. Holding service latch with its top flush with top of pad, center top hole on vertical line and mark it.
4. Drill on mark with a No. 3 drill and tap the hole with a $\frac{1}{4}$ -28 tap.
5. Bolt latch to tub using hole just made and line up latch vertically.
6. Drill and tap two more holes using the bottom holes in the latch for templates.
7. Assemble shims under latch and bolt to tub.
8. Test for door seal. Adjust if necessary.

NOTE: Part No. 98189 Service Door Latch assembly includes all the necessary screws, lock washers, and shims.

INLET VALVE ASSEMBLY

Removal:

1. Remove top panel and back panel.
2. Remove hot and cold water inlet hoses.
3. Disconnect the three wires from the inlet valve solenoids and unhook the wiring harness from the thermostat.
4. Disconnect the thermostat outlet hose.
5. Remove bolt, nut, and lockwasher which fasten inlet valve to mounting bracket on base.
6. Lift out inlet valve and thermostat assembly.
7. Remove thermostat by unscrewing flare nut which holds it to inlet valve body.

Disassembly:

1. Remove coil assembly by removing the long cap screw which passes through the coil cover and into the valve body.
2. Place valve body in a vise so that one jaw clamps on back of valve body and other jaw clamps on faces of inlet ports.
3. Loosen flare nuts which hold the armature covers and remove covers. (See note.)
4. Remove stop washer on cold water valve.
5. Remove valve armatures and cold water lower plunger.
6. Remove rubber valve seats and retaining rings with a small hook made of stiff wire.

(Do not perform this operation unless seat is already defective as it will be mutilated in removal.)

The following steps are for disassembly of the coil assembly only:

7. Straighten out small tabs which clamp cover to cover base and remove base.
8. Lift out coils and terminal block.
9. Remove split washers from coils.
10. Unsolder wires from terminal block to coils.

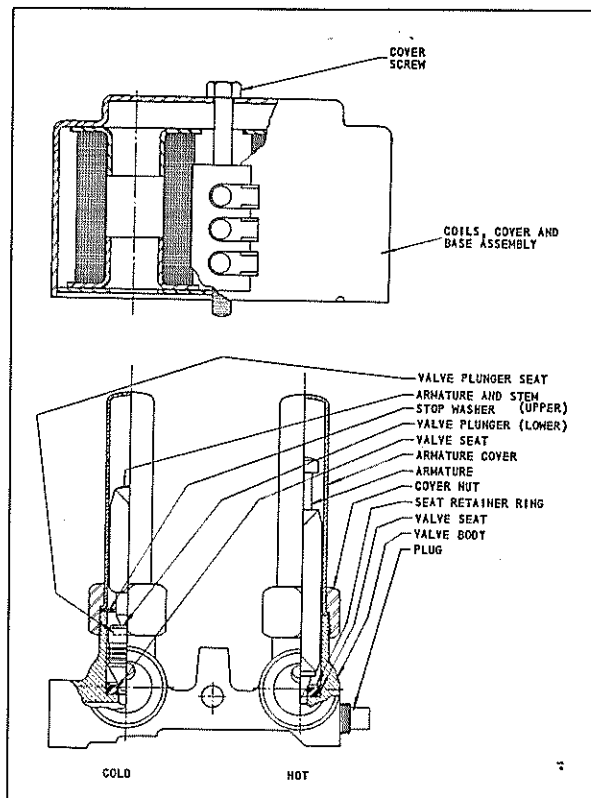


Figure 13—Inlet Valve Assembly

NOTE: In performing steps 3, 4, 5 and 6, it is good practice to disassemble and repair only one side of the valve at a time, thus preventing the possibility of interchanging the parts. This also holds true for step 10.

Assembly:

1. Reverse the procedure in steps 10 to 7.
2. Insert the rubber seats and retaining rings and push them down into place with a piece of $\frac{1}{2}$ " dowel or metal rod machined flat across one end. (The seat with the small hole goes on the hot water side and the seat with the large hole goes on the cold water side.)
3. Place valve in a vise.
4. Reverse the procedure in steps 5, 4, 3, and 1, under "Disassembly."

Installation:

1. Reverse the procedure in steps 7 to 2.

NOTE ON EARLY VALVES: The inlet valve and thermostat assemblies have undergone changes from time to time which fact somewhat alters the service procedure on the early units.

On units between 26,400 and 32,000, the valves had rubber seats, but the cold water valve did not have a dual plunger. In servicing this valve, equip it with a dual plunger and a valve seat retaining ring (in case one is not already installed). Parts required are valve armature, part No. 98223, valve plunger and rubber seat assembly, part No. 98220, stop washer, part No. 98224, and snap ring, part No. 98202.

On units between 20,640 and 26,400, the valve did not have rubber seats. In servicing this valve, it should be replaced with a part No. 97830 valve with dual cold water plungers and rubber seats.

On units below 20,640 the thermostat was not easily detachable. In servicing this valve, the entire inlet valve and thermostat assembly should be replaced with a part No. SK-400 inlet valve and thermostat kit. This kit contains all the necessary accessories for making the change-over.

NOTE ON CHANGING INLET VALVE: To prevent water from flowing back out of the mixing chamber when replacing an inlet valve or thermostat assembly it is only necessary to slit a piece of rubber in such a manner that it will slip over and cover the end of the spray tube nozzle at the point where it enters the tub. This removes the air pressure and allows the changing of the inlet valve without the draining of the mixing chamber.

THERMOSTAT*Removal:*

1. Follow removal procedure steps 1 to 7 under the "Inlet Valve Assembly."

Disassembly:

1. Remove rubber support washer.

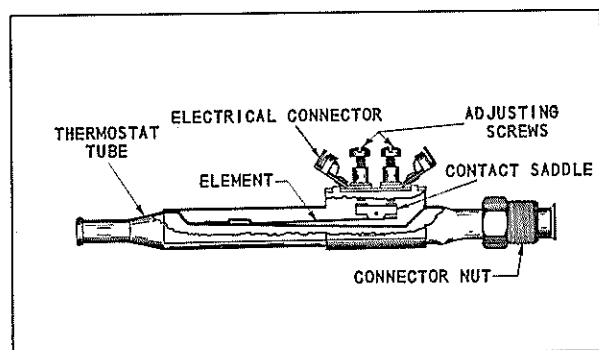


Figure 14—Thermostat Assembly

2. Remove short wire which connects thermostat to cold water solenoid. (Green with red tracer.)

Assembly:

1. Reverse steps 2 and 1 under "Disassembly."

Installation:

1. Reverse steps 7 to 2 of the Removal procedure under "The Inlet Valve Assembly."

NOTE ON EARLY THERMOSTATS: Use part No. 98091, thermostat assembly, to replace the thermostats on all units above serial number 20,640. On units below 20,640 the entire inlet valve and thermostat assembly must be replaced. Use SK-400 Kit for this purpose.

Adjustment:

1. Remove belt.
2. Start unit on wash cycle with selector switch on "Hot" and allow tub to fill. This warms up unit.
3. Advance time control knob until tub drains and then move knob forward to last spray rinse and allow water to enter for one minute.
4. Hold thermometer bulb in spray near spray nozzle and read temperature. Should be between 98 and 100 degrees.
5. If temperature is too high, above 100 degrees, turn screws on thermostat clockwise until correct temperature is reached.
6. If temperature is too low, below 98 degrees, turn screws on thermostat counter-clockwise until correct temperature is reached.
7. Install belt.

POWER UNIT*Removal:*

1. Remove top panel, back panel and cabinet.
2. Remove drain hose.
3. Remove belt.
4. Disconnect tub hose at drain valve.
5. Disconnect wiring harness from motor, drain valve solenoid, and shifter solenoid.
6. Remove cap which clamps pump-end motor support to rubber bushing on motor support rod.
7. Remove motor, transmission and pump assembly by sliding transmission-end motor support and bushing off motor support rod.

Disassembly:

1. The removal of the various parts of the power unit is covered in subsequent paragraphs.

Installation:

1. Reverse steps 7 to 2 under "Removal."

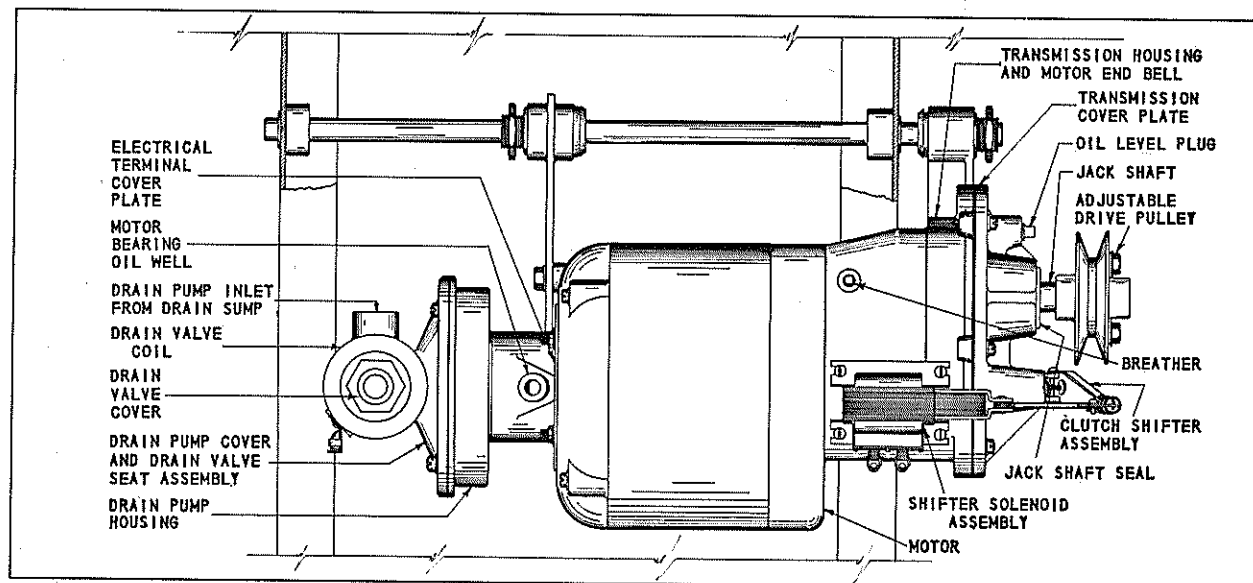


Figure 15—The Power Unit

NOTE ON EARLY POWER UNITS: On units previous to serial No. 52030, the motor support rod passed through bushings in the front and rear cradles and was locked in place by set screws or locking nuts. The motor supports and bushings were also locked to the rod by locking nuts. To remove these power units first loosen the locking nuts on the motor support bushings and loosen the locking nuts or set screws in the rod bushings on the front and rear cradles. Then remove the motor support rod and remove the power unit.

THE ASSEMBLIES AND PARTS OF THE POWER PLANT

CLUTCH SHIFTER AND SOLENOID ASSEMBLY

Removal:

1. Remove top panel, back panel and cabinet.
2. Unhook wiring harness from shifter solenoid.
3. Remove Pin which holds Arm on Solenoid to Bell Crank.
4. Remove four Solenoid Mounting Screws.

Steps 5 to 8, inclusive, are for the removal of the Clutch Shifter Assembly only.

5. Remove Cotter Key and remove Clutch Shifter Hinge Pin.
6. Remove Clutch Shifter Arm Assembly.
7. Remove Shifter Rod and Seal Assembly.
8. Remove Shifter Ball.

Installation:

1. Insert Shifter Ball.
2. Insert Clutch Shifter Rod, using inserting Tool ST-141.

3. Reverse procedure in steps 6 to 2 under "Removal."

Adjustment:

1. Push Solenoid Armature in by hand until a stop point is reached and further effort must be exerted to cause Armature to bottom in Solenoid.
2. Hold Armature at first stop point and draw a pencil mark on the Armature along the solenoid body.
3. Push armature all the way in and draw another pencil mark. These marks should be $\frac{1}{8}$ " apart.
4. If marks are more or less than $\frac{1}{8}$ " apart, unlock adjusting screw nut and turn adjusting screw until proper clearance is obtained.
5. Lock adjusting Screw Nut.

ADJUSTMENT OF EARLY SOLENOIDS:

On units below serial number 20,640 the solenoid armature was connected to the bell crank by a threaded rod and the adjusting screw and nut were not used. On these solenoids, adjustment is made by shortening or lengthening this threaded rod. The settings are the same as those for the later solenoid.

NOTE ON INTERCHANGEABILITY: The type of solenoid just described (part #97412) is not interchangeable with the later solenoids (parts #97908 and 98077). The only difference between the two later solenoids, however, is in the electrical connections; the part #98077 has plug-in receptacles and the part #97908 does not. They are interchangeable.

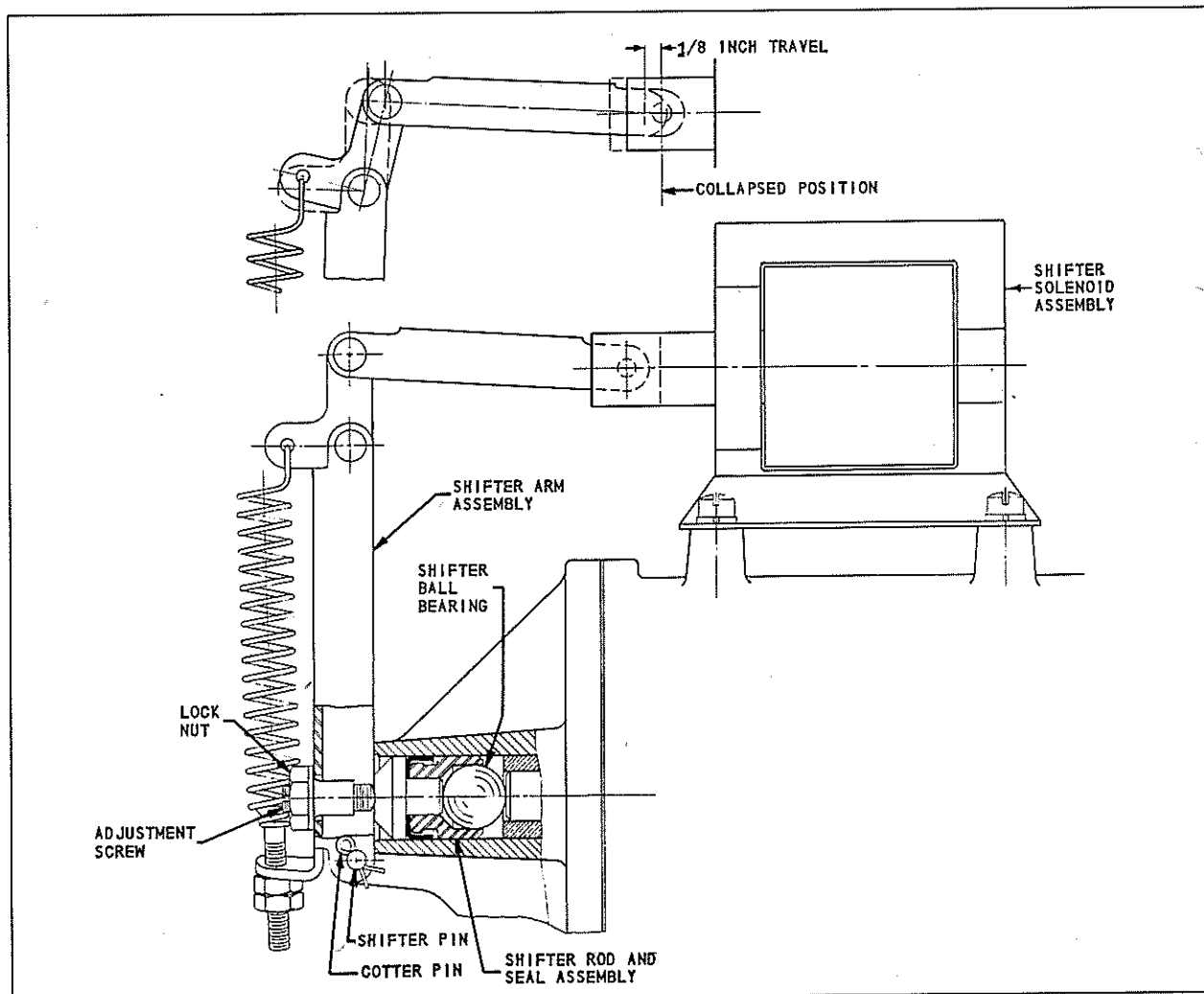


Figure 16—Clutch Shifter and Solenoid Assembly

DRAIN VALVE AND SOLENOID ASSEMBLY*Disassembly:*

1. Remove top panel, back panel, and cabinet.
2. Unhook wiring harness from drain valve solenoid.
3. Remove drain valve cover nut.
4. Remove drain valve solenoid.
5. Remove drain valve cover and gasket.
6. Remove drain valve plunger.

Assembly:

1. Reverse procedure in steps 6 to 2.

NOTE ON EARLY DRAIN VALVES: In servicing units under serial number 32,000 the drain valve armature and valve stem assembly, and the armature cover, should be replaced with the improved part #98170 armature and valve stem, and part #98169 Cover. The old parts may be distinguished from the new parts by the fact that the early armature is round instead of

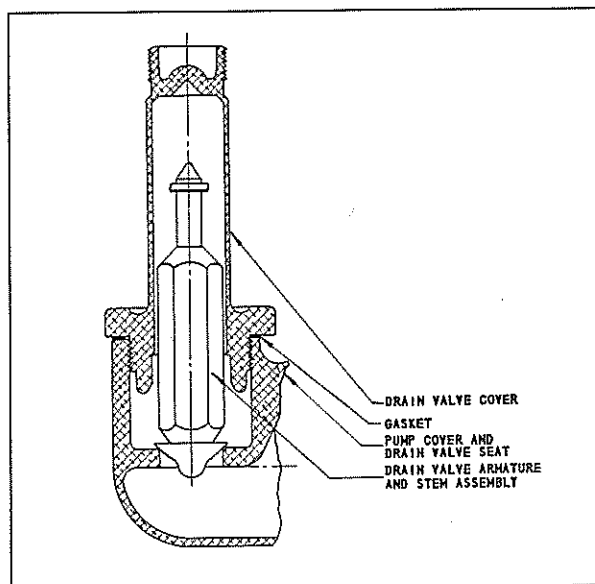


Figure 17—Drain Valve and Solenoid Assembly

hexagonal in shape, and the cover is flat across the top, while the new one is indented approximately $\frac{1}{4}$ ". It is not necessary to change the solenoid assembly as the old solenoids may be used with the new type valve.

WATER PUMP ASSEMBLY

Removal:

1. Remove top panel, back panel and cabinet.
2. Remove drain valve and solenoid assembly.
3. Disconnect Drain Valve inlet hose at drain valve.
4. Remove pump cover and gasket.
5. Disconnect drain hose.
6. Remove pump impeller and gasket (use $\frac{1}{8}$ " Allen Wrench).
7. Remove drain pump outlet housing and gasket.
8. Remove bronze bushing from shaft.

Disassembly:

1. Remove water pump seal (use seal tools ST-100 and ST-101).

Assembly:

1. Install water pump seal.

Installation:

1. Reverse procedure in steps 8 and 7 under "Removal."
2. Install pump impeller and gasket making sure that gasket is compressed against bronze bushing so that a good seal is secured.
3. Reverse procedure in steps 5 to 2 under "Removal."

NOTE ON BRONZE BUSHINGS: On units below serial number 20,640, the bronze bushings which govern the end play in the motor shaft, and which form the surface which rotates against the water pump seal, was part of the im-

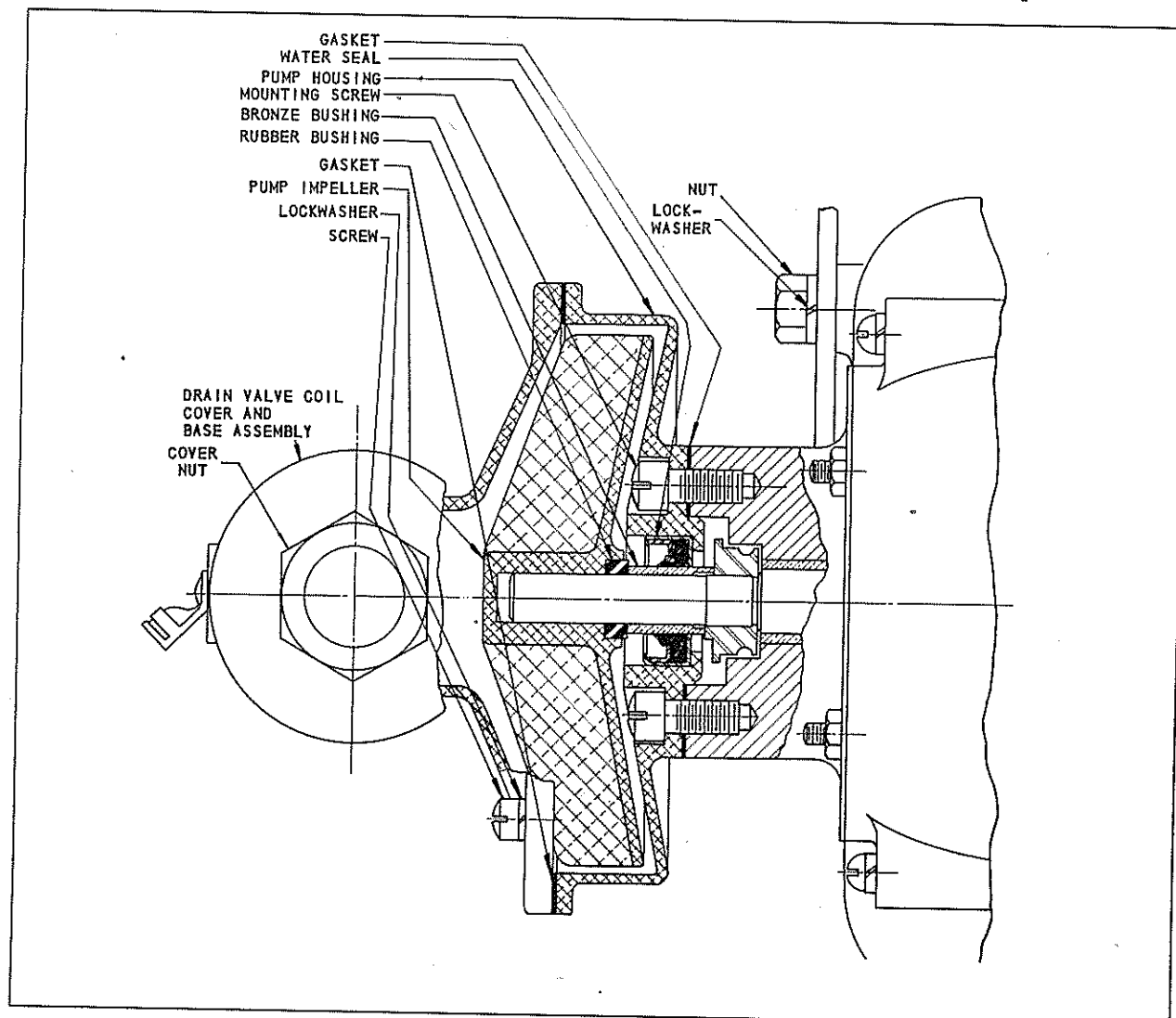


Figure 18—Pump Assembly

PELLER assembly. On these units it is necessary to push the motor armature all the way toward the pump end by inserting a screw driver into the openings in the transmission end bell, when the pump impeller is being installed. When the impeller set screw has been tightened, the end play should be approximately $\frac{1}{32}$ of an inch. This is an important adjustment since it governs the operation of the motor starting switch.

On units from 20,640 to 34,375, the end play is governed by a bronze bushing which is pressed on the motor shaft. Its location is set at the factory and no adjustment should be required. Units previous to 20,640 can be equipped with this feature provided the motor and transmission are dismantled so as to allow the bushing (part #97905) to be pressed on the shaft. When this is done a new pump impeller, Part #97907, and Gasket, Part #97906, must be used. Here again end play (governed by the location of the bronze bushing) should be held to $\frac{1}{32}$ ".

On units above 34,375, a steel bushing pressed on the motor shaft controls end play and serves as the driving means for the bronze bushing, which is slip fitted to the shaft. On these units the bronze bushing may be removed for service.

NOTE ON EARLY OUTLET HOUSING: On units previous to serial number 34,375, one of the motor support brackets was assembled to the pump outlet housing assembly. To remove the pump on these units it is necessary to loosen the motor hanger rod and slide it back. The outlet housing on Units previous to 34,375 is not interchangeable with the outlet housing used on Units after that number.

NOTE ON EARLY INLET COVERS: In servicing pumps on which a part #97654, Inlet Cover, is used, the inlet cover should be replaced with the new type part #97680. The part number is stamped on the cover at the drain valve inlet port.

NOTE ON EARLY SEALS: The water pump seal has been improved from time to time; therefore, in servicing pumps on early model units, the seal assembly should be replaced with the latest type. The latest seal may be recognized by these facts: The sealing agent is sirvine, a rubber-like material. It is compressed by a spring; the body is made of zinc and is about $\frac{1}{32}$ " in thickness. If the seal found in the pump outlet housing does not answer to this description, it should be changed to the latest type, part #97570, Seal.

TRANSMISSION ASSEMBLY

Disassembly:

1. Remove top panel, back panel and cabinet.
2. Remove motor, transmission and pump assembly from unit.
3. Remove Pulley.

4. Remove Clutch Shifter Arm.
5. Remove clutch shifter rod and ball.
6. Remove oil from transmission.
7. Remove transmission cover.
8. Remove low speed drive gear, noting carefully how washers are installed.
9. Remove jack shaft and gear assemblies as a unit, keeping spacers in place on jack shaft.
10. Remove clutch assembly and splined sleeve as a unit.
11. Remove cup washer on motor shaft.
12. Wash out transmission housing with kerosene or carbon tetrachloride and dry. Also wash parts as they are disassembled.

Steps 13 to 17 are for the disassembly of the high speed clutch group only.

13. Remove clutch pressure plate and clutch release spring.
14. Remove clutch plate retaining ring.
15. Remove clutch plates.
16. Remove clutch plate spacer.

NOTE: Never attempt to service a clutch by changing only one plate. Change them in sets, using kit No. SK-411.

17. Remove splined sleeve.

Steps 18 to 25, inclusive, are for the disassembly of the jack shaft group only.

18. Remove spacer sleeve and spacer washer on outer end of jack shaft.
19. Remove thrust washer on inner end of jack shaft.
20. Remove high gear retaining ring.
21. Remove high gear and split washer.
22. Remove high gear woodruff key.
23. Remove low gear clutch and retarder spring.
24. Remove low gear clutch screw and woodruff key.
25. Remove low gear and split washer.

NOTE: Never change only one gear of a set; change both gears. The low speed driving and driven gears are supplied in Kit number SK-408. The high speed driving and driven gears (driving gear attached to clutch case) are supplied in Kit number SK-409. The low gear clutch and clutch screw should also be changed in sets. They are supplied in Kit number SK-410.

Steps 26 to 30, inclusive, are for disassembly of transmission cover and transmission housing only.

26. Remove jack shaft bearing from transmission cover.
27. Remove jack shaft oil seal.

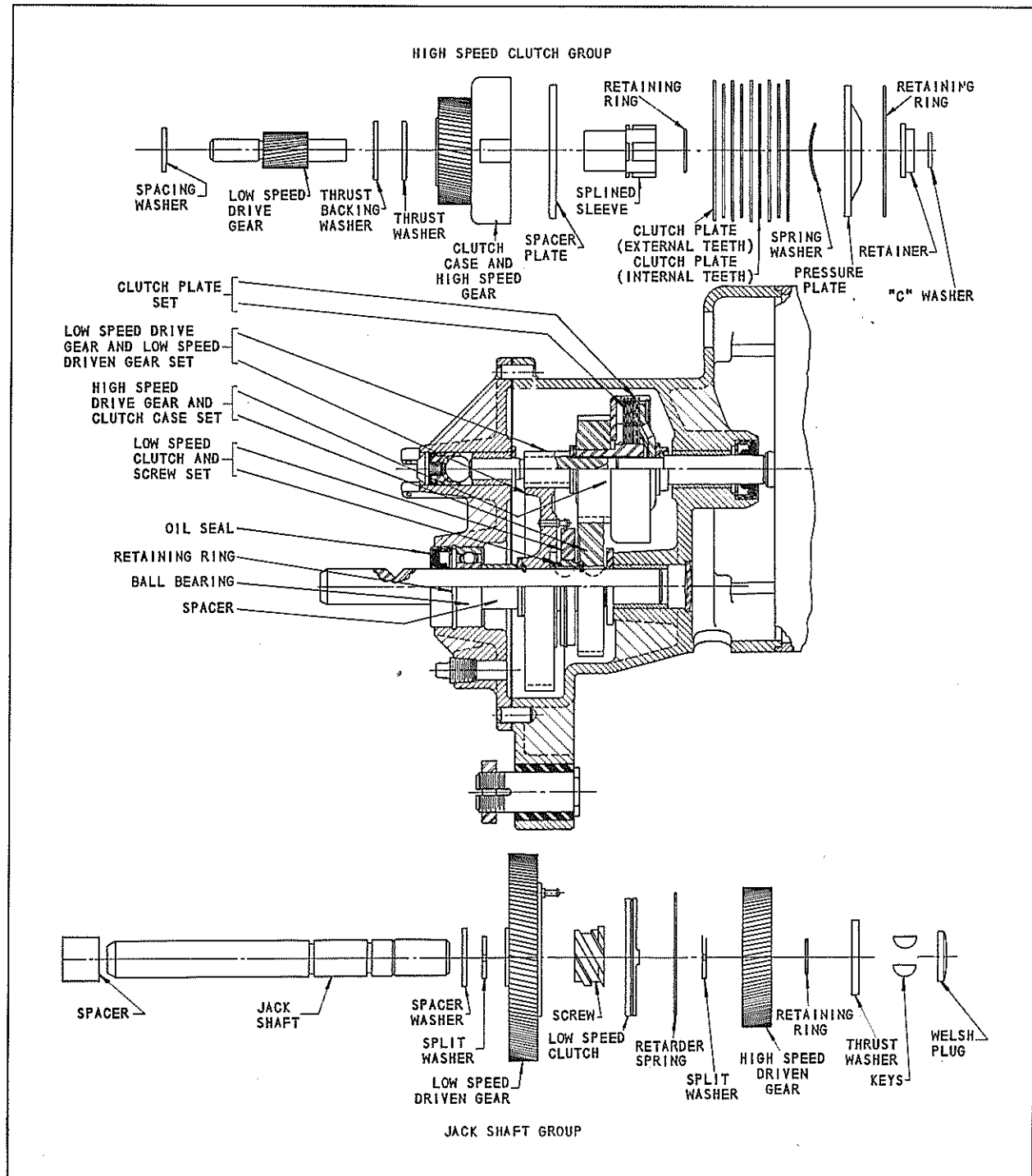


Figure 19—Transmission Assembly

28. Remove "C" washer on motor shaft.
29. Remove transmission housing from motor by removing four screws which pass through motor body and into housing.
30. Remove motor shaft oil seal in transmission housing.

Assembly:

1. Install oil seal in transmission housing. (The smallest diameter of the sealing surface goes toward the *inside* of the housing.)
2. Reverse steps 29 and 28.
3. Install jack shaft oil seal. (Do not attempt to set the seal case flush with the transmission cover as this will drive the seal retaining ring out of its groove.)

4. Install jack shaft bearing.

Steps 5 to 7, inclusive, are for assembly of jackshaft group only.

5. Reverse steps 25 to 20, inclusive.

6. Install thrust washer on inner (high gear) end of jack shaft, making sure that recessed side goes toward high gear. (Washer is recessed to fit over high gear retaining ring.)

7. Install spacer sleeve and spacer washer on outer (low gear) end of jack shaft.

Step 8 is for assembly of high speed clutch group only.

8. Reverse steps 17 to 13, inclusive.

Steps 9 to 12, inclusive, are for assembly of transmission as a whole.

9. Reverse steps 11 to 8, inclusive.

10. Install transmission cover, using a new gasket. (Jack shaft seal tool number ST-145 should be used to prevent injury to the seal.)

11. Install clutch shifter ball and clutch shifter rod. (Use inserting tool number ST-144.)

12. Put in transmission oil. (Use ½ pint (8 oz.) of Bendix Special Transmission Oil.) To check oil level, remove plug in transmission cover. Oil should just run out hole when proper level has been reached. ALWAYS USE NEW OIL.

13. Install clutch shifter arm.

14. Install pulley.

15. Install motor, transmission and pump assembly in unit.

NOTE: The breather pipe should be in place in the top of the transmission housing at any time the power plant is being run, even if the running period is quite short.

NOTES ON TESTING: It is good practice to test the power plant on the bench with no load after a transmission has been repaired, in order to determine whether or not all parts are free and not binding. The heat rise in the motor, being tested, can be compared with that of a motor in a unit which is operating satisfactorily. If the heat rise is excessive, the transmission should be again torn down and the difficulty corrected.

CAUTION: If the motor is allowed to run for periods in excess of twenty minutes, the pump should be removed from the assembly, or water should be supplied to the pump so as to prevent injury to the water pump seal.

STEP 11: On early transmissions it will be found that a ball thrust bearing with a thrust washer on either side is employed between the clutch pressure plate and the transmission hous-

ing. If this bearing is to be changed, the two companion thrust washers should be changed also.

STEP 26: On early transmissions a retaining ring was used to hold the jack shaft bearing in the transmission cover. If such is the case in the transmission being serviced, the ring must be removed to permit removal of the bearing.

STEP 28: Some transmissions were equipped with a split washer which was held in place on the motor shaft by the cup washer. If the unit being serviced has the split washer instead of the "C" washer now used, it should be removed along with the cup washer.

STEP 29: On early transmission and motor assemblies, these four screws also held the pump assembly to the motor. Therefore, in order to remove the transmission housing, the pump must first be removed.

NOTE ON BRONZE BUSHINGS: Do not attempt to service the bronze bushings in the transmission housing or the transmission cover. If they are worn or broken, the entire power unit should be returned to the factory for service.

NOTE ON TRANSMISSION COVER: Do not mix the transmission covers in case more than one unit is disassembled at a time. The covers are doweled to the transmission housing and are not interchangeable.

MOTOR ASSEMBLY

Disassembly:

1. Follow steps 1 to 12, inclusive, under "The Transmission Assembly" and 2 to 8, inclusive, under "The Pump Assembly."
2. Do not attempt to disassemble the motor further. If it is in need of repair, whether in or out of warranty, it should be shipped to the nearest United Motors Branch or Authorized Motor Repair Station for repair. (See note.)

Assembly:

1. Follow assembly steps 9 to 12, inclusive, under "The Transmission Assembly" and installation steps 1 to 3, under the "Pump Assembly."

Oiling:

1. The motor shaft is lubricated on the transmission end by the oil in the transmission itself. The pump end is lubricated by an oil wick which is thoroughly saturated with lubricant at the time the motor leaves the factory. A few drops of oil should be added once a year when the oil in the transmission is changed. The oil cup will be found in the motor end bell just below the motor terminal block.

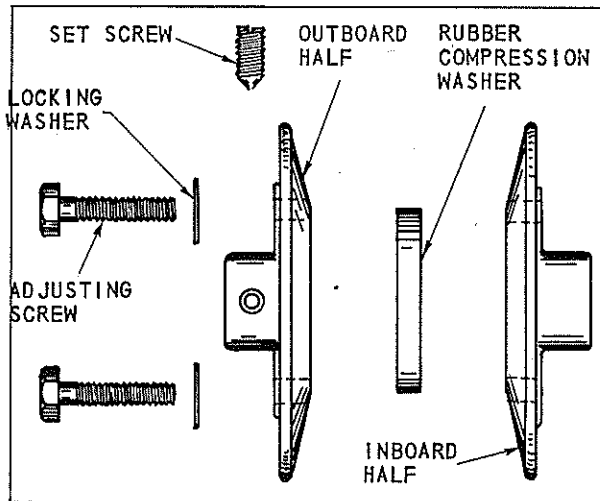


Figure 20—Adjustable Drive Pulley

NOTE: When a motor is sent to United Motors Service for repair the pump should be taken off and the transmission disassembled down to the transmission housing. The transmission housing should be left on and shipped with the motor.

ADJUSTABLE DRIVE PULLEY

Removal:

1. Loosen set screw in pulley hub.
2. Remove pulley, noting spacing between pulley and transmission cover.

Disassembly:

1. Flatten out locking washers. (On early pulleys, remove locking wire.)
2. Remove adjusting screws.

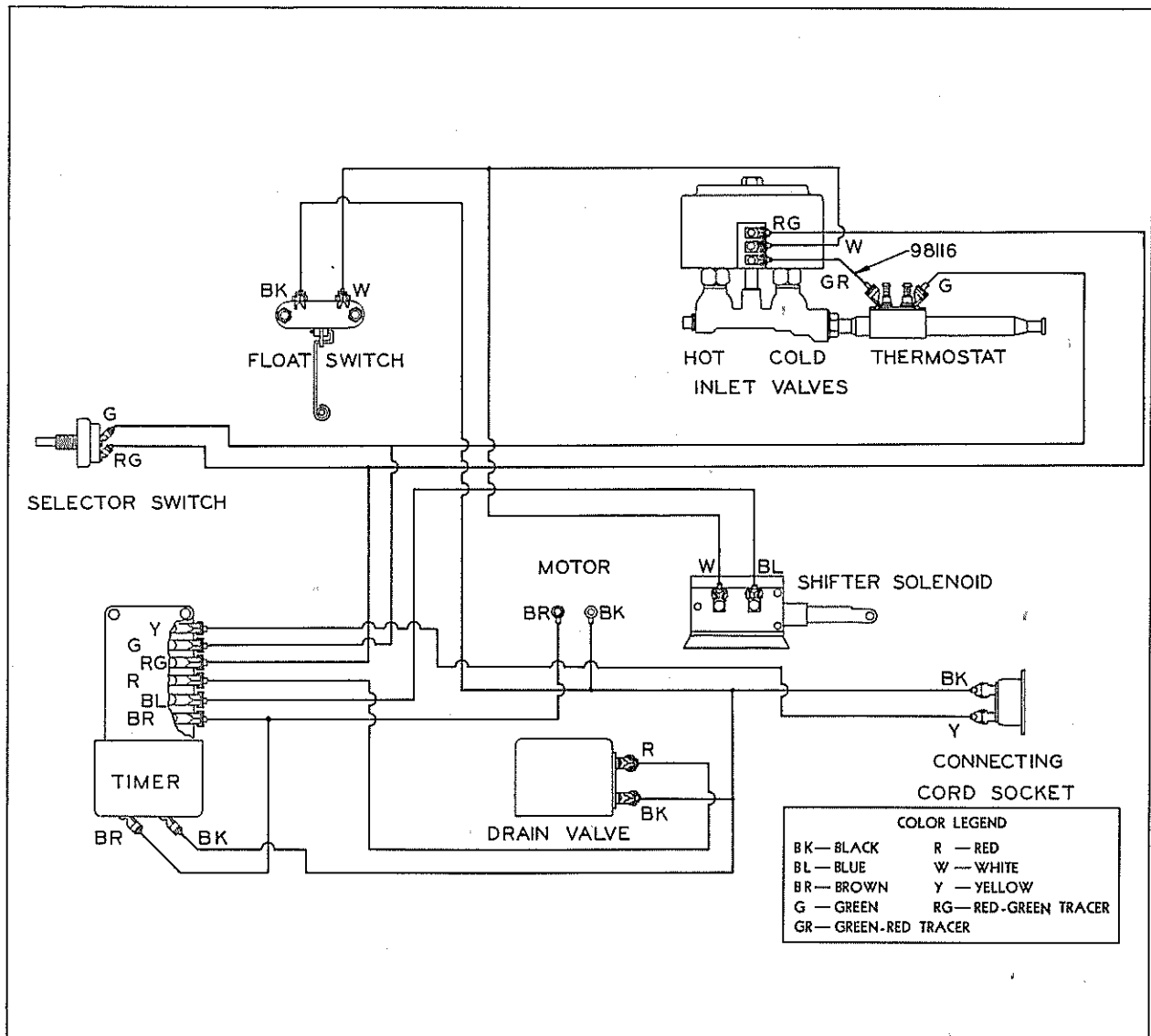


Figure 21—Wiring Diagram

SECTION VII

WASHING INFORMATION

(MODEL B AND S AUTOMATIC UNITS)

WATER

KINDS OF WATER

For washing purposes all water can be classified under two general headings, Hard Water and Soft Water. Water is called "Hard" because it contains quantities of Mineral Salts, most of which are usually dissolved from the soil. Soft water can be described as having no Mineral Salt content.

HARDNESS IN WATER

Two main elements are responsible for hardness in water; namely, calcium and magnesium. Most natural water is hard. The soil and rock with which it comes in contact determines and varies the hardness. When rain water, which can be considered soft, flows through the ground or in creeks and rivers, parts of lime and magnesium are picked up. Rain water often contains some or all of the following: dissolved Oxygen, Nitrogen, Ammonia, Carbonic Acid Gas, Nitric Acid, Sulphuric Acid and other components from impure air. These acid and alkaline

impurities increase the power of the rain water to dissolve the minerals in the ground.

DEFINITION OF HARDNESS

In this study of washing practice, the hardness in water can be defined as the soap consuming power of the water. Even with mildly hard water (5 to 10 grains) difficulty is experienced in getting good free soapsuds and the harder the water, the more difficult it becomes. When it is considered that water ranging from 50 to 75 grains hardness is not uncommon, it is easy to understand that much extra soap must be used to get results comparable to those obtainable when soft water is available, and this applies, not only to laundering, but to all things for which water and soap is used. It is estimated that for each 10 grains of hardness in water, there will be a loss of as much as 10 to 15 pounds of soap per 1000 gallons of water, as compared to the amount of soap used in an equal quantity of soft water.

WATER SOFTENERS

THE PURPOSE OF WATER SOFTENERS

When soap alone is used in hard water, the lime and magnesium in the water will combine with the soap and will form calcium and magnesium soaps, more commonly known as "Curds." The amount of soap so used, to a large degree, may be said to act as a water softener, but, since these curds do not form suds, they do not assist in cleansing; on the contrary, they can seriously hinder good washing. These calcium and magnesium soap curds are sticky in nature and often carry solid particles of dirt. Sometimes it is not possible for suds to keep them in suspension and as a result they will be deposited on the clothes and on the washing unit, thus contaminating the wash. Considering these facts, it is apparent that in those localities where the water contains any hardness it is desirable to soften or "break" the water to counteract the possibility of encountering difficulty because of the formation of curds and the undesirable results that may be associated with them.

KINDS OF WATER SOFTENERS

Water can be softened by removing the undesirable elements, and this can be accomplished through the use of a Zeolite Water Softener. Such water softeners are sold under a number of trade names, and for those localities that re-

quire it most of them can be supplied with filter beds that will remove other undesirable foreign matter, such as iron, from the water. In addition to mechanical water softeners a large number of package water softeners or "Breakers" are available, and most of them will reduce soap consumption and tend to counteract the undesirable effects of hard water and can be used to advantage when washing cottons and linens. Such water breakers or softeners can be classified into two general groups, alkalies and phosphates.

ALKALIES

Most package water softeners fall into this class, and many of them use as a base trisodium-phosphate which is usually considered the most effective of the alkali group. Trisodium-phosphate can be purchased in its original form in almost any locality at very reasonable prices.

The disadvantage of alkali breakers lies in the fact that they react in much the same manner as soap in hard water. When the alkali is added to the water, calcium salts are formed, and then when soap is added lime soap is formed; therefore, in those cases where too much alkaline breaker is used, the lime soap may be noticeable to the extent that it will be undesirable.

PHOSPHATES

Two of the best water breakers are sodium tetraphosphate and sodium metaphosphate. These two phosphates are different in character, but the results are about equal. Sodium metaphosphate is available in bulk in some localities and may also be purchased in packages, under the trade name "CALGON."

On the use of sodium metaphosphate or Calgon, chemical authorities say that instead of forming an insoluble precipitate, such as lime salts, when it is added to hard water, sodium metaphosphate forms a soluble compound which ties up the magnesium in the water so that it will not combine with soap and to a lesser extent the calcium is also tied up.

The use of a sufficient quantity of sodium metaphosphate in hard water will make it appear entirely soft, and as long as too much soap is not used with it no lime soaps will form. If too much soap is used, a small amount of lime soap will form, when this happens the solution will have a turbid appearance.

One of the important advantages of sodium metaphosphate is its ability to regenerate or dissolve any lime soaps that may be present in fabrics. Thus if the fabrics are in poor condition, because of an excess of lime soaps, it is possible to help the situation materially through the use of sodium metaphosphate or Calgon.

THE CORRECT AMOUNT OF SOFTENER

The amount of softener or breaker necessary depends entirely upon local water conditions; however, it is easy to determine the exact amount for any given locality. Prepare a one gallon container of hot water (160 degrees F.) and add to this about one-half teaspoon of water softener, wait a few minutes for the softener to work and then add two tablespoons of a good grade of soap; if upon agitating this solution a good live suds is formed, approximately the proper amount of softener per gallon of water is being used. The amount of softener should be varied until just the correct amount per gallon is found, then this figure should be noted for future reference, remembering that five or six times this amount should be used per tub of water in the Bendix unit.

SOAP

CHOOSING A SOAP

Granulated, "Built" soaps, such as Rinso, Concentrated Super Suds and Oxydol, will be found to be very satisfactory for washing cottons and linens. In the event it is ever necessary to wash exceedingly dirty materials, that cannot be cleaned with ordinary mild soaps, such cleaning agents as Octagon Soap Powder, Gold Dust or similar powders might be used to advantage. In this event it is advisable to sprinkle a liberal quantity of the powder over the dry clothes and fold it into the clothes before they are placed in the washing unit. In using such powders as Gold Dust, since they do not form much suds, it is advisable to mix with the powder a quantity of granulated soap.

"Built" soaps and soap powders should not be used for washing fine fabrics, such as silks, rayons or wools. For such applications, soap like Lux, Ivory Snow, Palmolive Beads and Ivory Flakes will be found more satisfactory, as a general rule.

The word "Soap" may represent almost any combination of fats, oils and builders, some satisfactory and some questionable; therefore, it is usually a poor policy to recommend "Cheap" soaps. It is a good policy, for the sake of satisfaction and economy, to use and recommend only such soaps as have been proven satisfactory.

Soap has no cleansing value until it is dissolved. The ideal soap will dissolve rapidly in either hot or lukewarm water. A good soap will form a rich suds, that will not be difficult to

maintain throughout the entire soaking or washing operation and it will be active enough to loosen the dirt and carry it in suspension, yet gentle enough, so that the fabrics will not be damaged.

THE ACTION OF SOAP

When soap is dissolved, it tends to neutralize any acid that may be present in the fabrics in the wash. Also the soap will tend to soften the water. It will almost completely soften the hardest water; however, the harder the water the more soap required. Therefore, and for the reasons outlined in the section of this booklet entitled "Water Softeners," it is recommended that a water softener of the proper kind be used before soap is added to the water.

Soap has properties that tend to lower the surface tension of the water and thus permits it to penetrate and wet the entire fabric. The soap solution or suds then loosens the film of grease and dirt and since the soap solution is forced through the meshes of the fabric, it picks up the particles of dirt and holds them in suspension. The attraction between soap and dirt is greater than the attraction between fabric and dirt; therefore, the dirt is held by the soap and is carried away when the soap solution is drained away. A given amount of soap can hold only a certain amount of dirt. When the suds tend to fall, they are saturated with dirt and consequently used up; therefore, it is obvious that the suds must be kept up to the correct level at all times or good results cannot be expected.

BLEACHES

THE PURPOSE AND USE OF BLEACHES

Drying clothes in the sunshine and fresh breeze is usually the most satisfactory bleach. However, this is not always possible or practical and for this reason chemical bleaches have been developed. These are usually mild acid solutions, intended for whitening and stain removal. The use of bleaching agents is rather widespread and under some circumstances desirable; however, the continued use of bleaches or the use of excessive amounts, may have harmful effects. Many bleaches are available, some of them are: Clorox, Purex, Oxol and Javelle water. All of these have as the active ingredient, sodium hy-

pochlorite. All chemical bleaches should be used with great care in accordance with the instructions on the container, (usually about one to one and one-half tablespoons per gallon of water). The bleach should be diluted in water before adding and in the regular washing cycle, can usually be used to best advantage in the second rinse period. Another method is to allow the Unit to complete the full cycle in the regular manner and when it is completed the Unit can be started in the washing period again and the bleach alone can be added, allowing the cycle to continue through all of the rinses in the regular manner. Bleaches should never be used on anything except white cotton and linen goods.

BLUING

THE ACTION OF BLUING

The U. S. Department of Agriculture, in commenting on bluing, says that "Bluing is used in laundering for the purpose of covering or neutralizing the yellowish tint of white fabrics. It does not remove the cause of the yellow tint, but merely produces a grey to which the eye is less sensitive and which appears white."

TYPES AND USE OF BLUING

Today Bluing is being used less and less. The modern and most satisfactory method is the use

of bluing that is made to go into the wash water, just after the softener and before the soap. Such a modern bluing is available on the market under the trade name "LaFrance" and is a soap and bluing mixture. "LaFrance" dissolves instantly and with its use there is little possibility of streaking the clothes. Liquid and Ball Bluings can be used; however, they carry with them a greater possibility of streaking. If they are used they should be dissolved in plenty of water and added in the second rinse.

FABRICS

TYPES OF FABRICS

Three general types of fabrics are encountered in home laundering practice: Vegetable, Animal and Synthetic. They must be washed separately, because vegetable fibres generally require and will stand more strenuous treatment than can be given to those belonging to the animal group. Cottons and linens are made from vegetable fibres and have considerable resistance to heat, rubbing and handling. Silks and woolens are made from animal fibres and should not be subjected to excessively high or low temperatures or excessive rubbing and handling.

Only those clothes which require and will stand the same water temperature, may be washed together. Silks and woolens which require lukewarm water and a mild pure soap, should never be washed with white cottons and linens which require and will stand hot water and more active soaps.

COTTONS AND LINENS

White cottons and linens should be washed in hot water (160 degrees F.) while colored cottons and linens must be given special attention. Colored cottons and linens can be classified in two groups: Fast Colors and Unfast Colors. Color-

fast cottons and linens can be washed in hot water in the same manner as white goods. Unfast colors must be washed in lukewarm water with a mild soap. Extreme care must be experienced in washing unfast colors, since sometimes the colors in one garment will run and discolor the entire load, unless it is immediately removed from the unit. The color fastness of a new garment can be tested by squeezing a sample of it in a tumbler of lukewarm water for several minutes. If the water is discolored, the dye is not entirely fast. Washing a garment in which the colors are not entirely fast may fade it, and if this chance is taken it must be washed separately and dried quickly and carefully.

WOOLENS

Woolen articles come under the classification of animal fibres and as such must be treated with the greatest of care in laundering. There are no set rules for washing woolens that will fit all cases. Some woolen garments may be washed in a certain manner eight or ten times with satisfactory results and the very next time shrinkage or felting may occur.

Wool, silk-wool and cotton-wool garments should always be cleaned in accordance with the

textile manufacturers' recommendations. As a general rule textile manufacturers do not advocate the laundering of washable woollens in machines. Instead it is deemed more advisable to wash these delicate fabrics by hand. If the chance of washing woollens by the machine method is taken, only lukewarm water should be used and a mild pure soap that will form a high stiff suds should be employed. Remember handling, agitating and rubbing woollens in water can cause shrinkage and felting; therefore they should not be washed over five minutes as a general rule and should never be soaked.

When woollens are washed by hand, they should be squeezed in lukewarm suds and rinsed in lukewarm to cool water. Never soak woollens in standing water. Care must be exercised to see that various dark colors are not mixed together when washing, because they may discolor one another. Color fastness tests should always be made. This can be done as previously described for cottons and linens. During the laundering process woollens should not be exposed to excessive heat, the direct rays of the sun, or freezing temperature.

SILKS AND SYNTHETICS

Silks and synthetic fabrics are usually not as delicate as woollens, but a great deal of care must be used in washing them to get satisfactory results without the possibility of damage. It is important to wash such articles frequently, as soon as they begin to show soil. Dust and invisible perspiration, tend to dull colors and also are difficult to remove if allowed to remain. All

new articles should be submitted to a color test in lukewarm water, the same as outlined for cottons and linens. All trimmings, such as buttons, buckles, bows and ribbons, should be removed before laundering, since otherwise damage may result.

Mild pure soaps should be used with silks and synthetics. If any spots remain after washing, work some soap suds into them with a soft brush or the fingers; never rub them with cake soap. Crepe garments, due to their construction, will usually shrink when wet; therefore, they should be measured before washing, and then when drying and ironing they can be gently worked back to the correct measurements. Silks and synthetic fabrics should never be rubbed or boiled and water should never be extracted by twisting the fabric.

Drying and Ironing have as much bearing on the successful laundering of silks and synthetics as the actual washing. After washing, such articles should be rolled in a dry turkish towel to absorb excess moisture and then unrolled and removed at once. Delicate, light weight fabrics are often ready to iron as soon as the water is extracted from them. Heavier fabrics and those that look best when ironed dry, may be hung indoors or in the shade. The iron should be just warm, never hot. The garments should be ironed on the wrong side of the fabric in the direction of the weave or threads. Some materials, such as crepes, and seersuckers, become "Flat-Looking" if ironed damp, therefore, they should be ironed dry or almost dry. This also applies to other synthetic and novelty materials.

SOILS

TYPES OF SOIL IN THE AVERAGE WASH

Four different kinds of soil are found in the average family wash; First, there is what may be termed clean soil, which includes such things as dust and soot from the air and plain dirt. This type of soil alone is not difficult to remove in washing. However, it is usually held to the fabrics by a second type of soil and in this classification, fall such things as grease, oil and sticky substances. The removal of these usually requires, depending upon the type of fabric, hot water and good active suds.

The third classification may be called albuminous soil and under this, come such stains as are caused by perspiration, blood, milk, meat juices and white of egg. None of these should come into immediate contact with hot water, because they may be "Set" in the fabric; instead, they should first be soaked in lukewarm suds. Stains from such things as berry juices, medicine, ink and paint, make up the fourth group. These must often receive special treatment as described in the section of this booklet entitled "Stain Removal."

STAIN REMOVAL

MATERIALS

Many common household stains come out in the wash, but there are a number that require special treatment. Stain Removal must not affect the fabric in strength, color, or appearance. These non-washable stains can be removed at home if exacting care is used. Valuable or prized garments should be sent to a reputable dry cleaner if there is likelihood of difficulty.

Before removing a stain from colored fabric, experiment with an inconspicuous portion to determine the effect on the dye.

Some of the materials recommended for stain removal are very strong and may have toxic effects upon the user; others can be injurious to the person of the user; still others are explosive. Therefore proper precautions must be observed when using these materials.

STAIN	COTTONS AND LINENS	SILKS, WOOLLENS AND RAYONS	STAIN	COTTONS AND LINENS	SILKS, WOOLLENS AND RAYONS
ARGYROL	Tincture of Iodine, then "Hypo."	"Hypo" and Ammonia.	INK	Hydrosulphite, rinse, then oxalic acid.	Alcohol, then lemon juice.
BLOOD	Sponge with cold water. If stain remains, soak in diluted ammonia until loosened, then launder.	Sponge with cold water. If stain remains, bleach with hydrogen peroxide.	IODINE	Sponge in diluted ammonia solution, then launder.	Steam over teakettle spout or sponge with wood alcohol.
CANDLE WAX	Remove excess wax with dull knife. Rub lard thoroughly into spot. Then launder in hot water. If stain remains, sponge with wood alcohol.	For paraffin, place material between blotting paper, press with warm iron. sponge with carbon tetrachloride.	LEATHER	Treat the same as dye stains.	
CHEWING GUM	Remove all you can with edge of spoon. Soak in turpentine or kerosene and sponge with carbon tetrachloride, then launder.	Sponge with carbon tetrachloride.	LIPSTICK	Carbon tetrachloride and then hydrosulphite.	Rub in cold cream, follow with carbon tetrachloride.
CHOCOLATE OR COCOA	Soak stain in wood alcohol with a few drops of ammonia solution added. Then launder. If stain remains, bleach with Javelle Water.	Sponge with carbon tetrachloride and bleach any remaining stain with hydrogen peroxide.	MERCURIOCHROME	Launder. If stain remains, bleach with Javelle Water.	Alcohol, then acetic acid, then alcohol.
COD-LIVER OIL	Work into stain a mixture of equal parts of banana oil and thick soap suds; then launder. Bleach remaining stain with Javelle Water.	Sponge with carbon tetrachloride. Bleach with hydrogen peroxide.	MILDEW	Launder. Bleach with Javelle Water and rinse with ammonia water.	Apply potassium permanganate until mildew is removed, then apply oxalic acid. Deeply grown mildew is impossible to remove.
COFFEE	Launder. Bleach remaining stain with Javelle Water.	Sponge with lukewarm water. Bleach remaining stain with hydrogen peroxide. If grease spot remains, sponge with carbon tetrachloride.	MILK, CREAM AND ICE CREAM	Launder. If a stain remains, bleach with Javelle Water.	Sponge with warm water. When dry, sponge with carbon tetrachloride.
DYE	Soak in heavy warm suds with one tablespoon of hydrogen peroxide added to each gallon of suds. Repeat until stain disappears. It may take 6 or 8 hours.	Use color remover sold for the purpose of removing old color from a garment previous to dyeing. Follow directions carefully.	MUD	Sponge with cold, then launder with hot soapy water. If stain remains, sponge with denatured alcohol.	Sponge with cold water. If stain remains, sponge with denatured alcohol.
EGG	Sponge with cold water. Launder. If stain remains, bleach with hydrogen peroxide.	Scrape off surface with edge of spoon, remove grease with carbon tetrachloride, sponge with cold water.	MUSTARD	Javelle or hydrosulphite.	Wood alcohol or chloroform.
FLY PAPER	Sponge with carbon tetrachloride.	Sponge with carbon tetrachloride.	NAIL POLISH	Sponge with banana oil, and launder.	Sponge with banana oil.
FRUIT JUICE	Stretch material over a bowl and pour boiling water through stain. If stain remains, bleach with Javelle Water.	Sponge with warm water. Then with hydrogen peroxide and ammonia water. If material is colored, sponge with 10% solution acetic acid.	PAINT	Soak in kerosene or turpentine, rub out as much as possible and launder.	Sponge with carbon tetrachloride or turpentine.
GRASS, GREEN VEGETABLES, SPINACH	Launder. If stain remains, bleach with Javelle Water or hydrogen peroxide.	Sponge the stain with wood alcohol or denatured alcohol.	PERSPIRATION	Dark stain, sponge with Javelle Water, then launder. Yellow stain, bleach with hydrogen peroxide.	Sponge with clear water or send to the dry cleaners.
GREASE AND TAR	Rub with lard or kerosene. Launder in hot soapy water. If spot remains, when dry, sponge with carbon tetrachloride.	Sponge with carbon tetrachloride or gasoline.	RUST	Oxalic acid or lemon juice.	It is almost impossible to remove iron rust from silk and wool.
INDELIBLE PENCIL	Launder in warm soapy water. Bleach with Javelle Water.	Sponge with denatured alcohol or carbon tetrachloride.	SCORCH	First launder, then bleach with Javelle Water. Deep scorch cannot be removed.	If scorch is light, apply hydrogen peroxide.
			SHOE POLISH	Follow directions for candle wax.	
			SUGAR SYRUPS	Launder. If chocolate or fruit is present, see above.	Sponge with clear water.
			TEA	Launder. If stain remains, bleach with lemon juice, place in sun, or use alternate applications of potassium permanganate and oxalic acid.	Sponge with clear water. If stain remains, bleach with potassium permanganate; then use lemon juice.
			WATER SPOTS	Launder entire garment.	Rub spot lightly with flat side of knife blade or clean coin. Press with warm iron on wrong side of material.

Figure 1
Stain Removal Chart

OXALIC ACID

Use a level tablespoonful to cup of warm water. Store safely and mark POISON. Rinse out oxalic acid thoroughly.

HYDROGEN PEROXIDE (Bleach)

Add one teaspoonful of ammonia or borax to cupful of peroxide for greater effectiveness.

SODIUM HYPOCHLORITE OR JAVELLE WATER (Bleach)

Use 2 to 5 tablespoons per quart of water. Never use on colored fabrics, silks, wools, and rayons.

SODIUM HYDROSULPHITE (Bleach)

Use about one teaspoonful to cup of hot water. Use while warm.

CARBON TETRACHLORIDE, CHLOROFORM, WOOD ALCOHOL (Solvents)

(Non-inflammable mixtures are preferable.)

Apply only to dry fabrics. Use with cup, bowl, or an absorbent pad.

"HYPO" (Sodium Thiosulphate)

Use as directed on container.

PROCEDURE

For light stains on white cotton, linen, silk and rayon, not colors or wool, apply a few drops of the correct stain remover with a medicine dropper, repeat as the liquid spreads. Rinse immediately. If stubborn, hold the stain in steam, over the spout of a boiling tea-kettle.

For heavy stains place the material wrong side out, over a cup or bowl, apply the solution and let it drip through. Another method is to place the stained portion wrong side out over a pad of several thicknesses of absorbent material. Move the pad when it is soiled. See Figure 1.

PRE-TREATING

Those parts of garments that may become very dirty, such as the collars and cuffs of shirts, should be pre-treated before being washed. Some people prefer not to follow this practice. However, in those cases where absolute cleanliness without damage to the fabrics is a factor

the pre-treating practice should be followed. It is only necessary to brush the parts in question, thoroughly, with soap suds; bar soap should not be used for this purpose because it will fill the meshes of the fabric and difficulty will be experienced in rinsing.

SORTING

Only those clothes which require and will stand the same water temperature, the same type of soap and the same handling, may be washed together.

Silks or woolens should not be washed with cottons and linens.

It is advisable not to wash vividly colored and delicately colored articles together.

Heavily soiled articles should not be washed along with clothes that are only lightly soiled.

White cottons and linens such as table linen, sheets, pillow cases, towels and white shirts can be washed together. Heavier soiled and light

colored cotton and linen materials, such as shirts, towels and body clothes can be washed together. Dark colored garments should be washed as a separate load, as a general rule.

All delicate fabrics, such as woolens, silks, synthetics and laces, require individual treatment and should be handled as outlined in other parts of this booklet.

While sorting, it is good practice to watch for tears and rips in the clothes which should be mended before washing. It is also important to remove pins, buckles and ornaments from garments; otherwise, damage may result. All pockets in garments should be emptied and when possible turned inside out.

WASHING IN THE BENDIX HOME LAUNDRY

LOADING THE UNIT

While the Bendix Home Laundry is small and compact, it will wash a full nine pound load of clothes. Surveys have shown that the average family wash ranges from 24 to 27 pounds. This means that the Bendix Home Laundry, with its nine pound capacity can handle the average wash in three loads. It is not necessary to weigh the clothes; when the cylinder is comfortably

full to within three or four inches of the top of the cylinder it will contain approximately the correct load. Care should be exercised to see that the cylinder is not overloaded since too large a load will not wash satisfactorily.

As previously pointed out the clothes can be sorted in three general classifications. These can be washed in any order that may be desirable in the Bendix. For best results it is not

advisable to wash a load of nothing but sheets; they should be mixed with smaller pieces. The number of sheets to be washed at one time will depend, to some extent, upon how many sheets are in the wash. If there are a total of four, they can be washed in two loads with smaller articles, if there are more than four, there probably will be enough smaller articles also to make more than two loads and the sheets can be divided.

When loading sheets there are two methods that may be followed with satisfactory results and these along with the instructions in the previous paragraph will tend to prevent "Balling."

Pick up the sheet in the center, shake it out so there are no air pockets, then place it in the cylinder so that the center part of the sheet follows the clock-wise motion of the cylinder ahead of the edges of the sheet. Another method followed by some owners is to pick up the sheet by one corner, letting it drop in a pile then load the sheet into the cylinder in this folded condition.

THE SOAK PERIOD

The soaking period is optional on the time control dial of the Bendix Home Laundry. However, most authorities agree that soaking is highly desirable for most cottons and linens; therefore, it is recommended that the soak period be used.

The time control knob should be turned to the beginning of the soak position on the dial. This starts the unit and lukewarm water will spray in, saturating the clothes as they tumble about. For most conditions, a 10 minute soak period will be found most satisfactory.

In those cases where water softener is used, it should be added as soon as the water has stopped entering the tub and after it has had an opportunity to act, soap should be added. It is important to add the proper amount of soap quickly to form suds immediately. It is advisable to experiment until approximately the proper amount of softener and soap, to meet local conditions, is determined. Then, almost the proper amount can be added at one time to form the correct suds, and if more is needed, it can be added slowly, a little at a time until the correct suds level for the fabrics being washed has been obtained.

When soaking cottons and linens, a good suds from a little above the center of the glass door to three-fourths of the way up on the glass door should be built and for satisfactory results this suds level must be maintained throughout the soak period; if the suds tends to drop this is an indication that they are saturated with dirt or used up, and as a result, more soap should be added, little by little to bring the suds to the correct level and they must be kept at this point.

When soaking delicate fabrics, a little more soap should be used to bring the suds to the top of the glass door, these additional suds act as a cushion for the clothes. The same precautions about keeping the suds level up, should be observed, as in the case of cottons and linens.

The value of the Bendix soaking period, using suds, should not be underestimated; there are many advantages to be gained, some of which are:

1. Surface dirt is loosened and removed.
2. Albuminous matter is dissolved.
3. The meshes of the fabric are opened so the soap solution can pass through more freely, resulting in more effective washing action.
4. Since part of the dirt is removed in the soak period the wash water will remain cleaner, again resulting in more effective washing action.

Considering the advantages to be gained, since soaking requires no work, the Bendix Way, there is no excuse for not using the Soak Period.

At the end of this period the dirty Soak Water drains out automatically and the unit comes to a stop. At this point, the time control knob comes to rest at the "OFF" position, located between the soak and wash periods on the dial. This automatic stop makes it unnecessary for the operator to watch the unit during the soak period, since there is no chance of the unit continuing the remainder of the washing operations before soap and other ingredients are added.

THE WASH PERIOD

From the "OFF" position of the time control, following the soak period, a slight clockwise movement of the time control knob will start the unit in the wash period.

When starting in the wash period, after the water has finished coming in, water softener, soap and bluing, as required, should be added. The softener and soap should be added and suds maintained at the proper level which is just above the center of the door for cottons and linens and to the top of the door for delicate fabrics. From this point on the Bendix Home Laundry requires no further attention.

Usually less soap is required for the wash period than the soak period, for the following reasons: First, much of the dirt has already been removed from the clothes by soaking. Second, water is hot for the wash period (when washing cottons and linens) while the soak water is lukewarm. Third, there will be some soap left in the clothes from the soak period.

If the entire available time allotted to the wash period should be used, it would be approximately 20 minutes. However, the best results for the average wash will be obtained by advancing the knob from the "OFF" position into the wash period, softener and soap should be added and then the knob should be advanced

directly to the 10 minute mark in the wash period on the dial. This will give exactly a 10 minute wash. It is possible to wash clothes too long. A given amount of suds and water can hold only a certain amount of dirt. If the solution is used too long two things happen, it becomes saturated with dirt and at the same time frictional breakdown may take place, when these things happen the suds is said to be weak and in this event, if the washing operation is continued, there is a possibility of the solution releasing some of the dirt, which will then be re-deposited on the clothes and in the unit. In the event that very dirty articles are being washed, at any time that the suds solution becomes black and dirty during the wash period, it is better to drain off the dirty water and start the wash period over again with fresh suds. Two short wash periods, under such circumstances, will give results that cannot be attained in one long period such as 20 minutes. This can be accomplished without any work on the part of the operator with the Bendix. Should it be desirable at any time to start the entire or any part of the washing cycle over again, this can readily be accomplished. It is only necessary to turn the time control knob in a clock-wise direction, to the rinse mark and then allow the unit to run until it comes to a stop, from this "OFF" position the time control knob can be advanced to any desired starting point, such as the 10 minute mark in the wash period.

The correct fundamental principle of washing is to send a cleansing fluid through the meshes of the fabric, with enough force to dislodge and carry away dirt. Correct washing is obtained by the action of the water, not by scrubbing the fabrics against a rough surface or churning them through the water. The correct washing principle is applied in the Bendix Home Laundry. The Bendix Washing Action is exclusive, the clothes are lifted by smooth baffles, located on the inside of the cylinder, and are then dropped through the water, thus forcing the water through the meshes of the fabric. At the same time the baffles gently massage the fabrics. Because of this gentle action clothes are not rubbed thin and worn out to remove the dirt.

At the end of the wash period the dirty water drains out and is pumped away automatically. Immediately afterward, clean water for the first spray rinse comes in.

THE FIRST RINSE PERIOD

The first rinse is a spray rinse. The water is the same temperature as for the wash period. If the selector switch is set for "Cottons and Linens—Hot" the first rinse will be Hot Water; if the selector switch is set for "Delicate Fabrics—Lukewarm" the first rinse will be lukewarm water. If cooler water should be sprayed on the clothes after being washed in hot water, the soap would congeal and tend to spot the clothes.

The first rinse flushes away most of the dirty suds remaining in the clothes from the wash period. The result of this rinse is similar to taking a shower bath or hanging clothes on a line and spraying them with a hose.

At the end of the first rinse period, the spray of water is shut off automatically; however, the cylinder continues to turn, tumbling and distributing the clothes so they will be properly arranged for the first extraction period.

THE FIRST EXTRACTION PERIOD

The first extraction period, as the name implies, removes the excess water and most of the remaining soil laden suds from the clothes. In this extraction or spin period the clothes are rapidly whirled around to literally force out the water. This water is thrown through the holes in the cylinder of the Bendix and into the tub from where it flows out and is pumped away.

This differs immensely from removing water by wringing, which would tend to press a certain amount of dirt and soap curds back in the fabric. There is no lifting of heavy clothes from the water and arranging them in a spinner or going through the messy and dangerous work of putting them through a power wringer.

When the first extraction period is completed, the cylinder slows down automatically and the second rinse water starts to come in.

THE SECOND RINSE PERIOD

Rinsing is said to be one-half of washing. After the soap suds are filled with dirt from the clothes, all of this must be flushed out of the material to have completely clean clothes.

The second rinse is a deep rinse or power rinse. The tub is filled with lukewarm water and the cylinder continues to revolve carrying the clothes up and dropping them through the water about 300 times. Such thorough rinsing is practically impossible with any other Home Laundering Method. Where difficulty is experienced because of hard water it is sometimes found helpful to add water softener for this rinse. If liquid or ball bluing is to be used, it should be added in this rinse; however, it should be diluted in plenty of water. LaFrance, added in the washing period will greatly reduce the possibility of streaking over this method. If a bleach is to be used it can be added at this time. Any bleach should be used with great care and in accordance with the instructions on the container. The bleach should be diluted in water before adding. When adding bluing or bleach remember that the Bendix only holds about one-third as much water as an ordinary washer or tub; therefore, the amount of bluing or bleach should be regulated accordingly.

After the second rinse is completed, the water is drained out and pumped away. The clothes have been rinsed as much or more than is usually the case with ordinary washing methods; however, in the Bendix they are given still another rinse.

THE THIRD RINSE PERIOD

The third and final rinse is a spray rinse of lukewarm water which is directed on the clothes as soon as the water from the second rinse is drained out. The drain remains open and the last traces of soapy water are flushed away, insuring an absolutely clean and sanitary wash.

THE FINAL EXTRACTION PERIOD

After the third rinse is completed, the clothes are again tumbled by the revolving cylinder to arrange them for the final extraction period.

The final extraction period damp dries the clothes by gently pressing out the water by means of the centrifugal force of the spinning cylinder. Every article in the cylinder is uniformly damp dried by removing just enough water to insure fast and uniform drying but not too much water, since a certain amount of moisture should stay in the clothes, so that sun and air will have the proper bleaching action when the clothes are put on the line.

At the end of the final extraction period, the time control pointer comes to rest at the "OFF" position from which the unit was originally

started. The entire unit is automatically shut off and the clothes may be removed at the will of the operator.

Since some types of fabrics pick up large quantities of lint that are released when the clothes are washed, it is recommended that the drain screen be checked and cleaned out after each wash.

HANGING AND DRYING

Sunshine is a most effective bleach for white cottons and linens; thus, whenever possible, they should be dried outdoors in the sun. **COLORED CLOTHES SHOULD BE DRIED IN THE SHADE.**

Wipe the line with a damp cloth before hanging the clothes. It is wise also to wash the clothespins occasionally in soapy water to keep them from soiling the wash. Clothes should be hung by the heaviest, firmest portion. Use clothespins at points of least strain.

Sort clothes before going outdoors and arrange them in the basket in the order they are to go on the line. Sheets and tablecloths should be folded hem to hem, wrong side out, and hung one-third over the line.

Hang shirts wrong side out, from the bottom. Hang pillow slips by the closed end, wrong side out. Hang two or three handkerchiefs or napkins together, by one corner—or by two, if there is room on the line.

GENERAL LAUNDERING INFORMATION

WHITE COTTONS AND LINENS

When washing white cottons and linens, real hot water will speed up washing and make clothes whiter. If the heater is at a distance from the Bendix, to be sure that lines are clear of cold or lukewarm water, set the time control knob at the rinse mark on the dial. Water will run in and drain out until it reaches the temperature desired. An easy temperature test is to touch the glass door. When the correct temperature is reached, turn dial to "OFF" position. Load the unit and proceed with washing. Be very careful to hold the suds at the correct level.

UNFAST COLORED COTTONS AND LINENS

Remove light colored trimmings that might become stained. Use mild suds with the selector switch set for "Delicate Fabrics."

If the dye in a colored garment is so unfast that it runs when tested, wash it separately. Be prepared for occasional fading or shrinkage, especially with silk and wool.

Never leave unfast fabrics damp in a heap in the clothes basket; even a little unfast embroidery may run and discolor a garment.

FAST COLORED COTTONS AND LINENS

Color-fast cottons and linens can be soaked first. To keep colors bright and clear, use fresh mild suds in the Bendix Home Laundry, with the selector switch set for "Cottons-Linens." Light colored clothes only slightly unfast may also be washed safely with mild suds with selector switch set for "Delicate Fabrics." Do not soak them over 5 minutes. Hang prints and other colored garments inside out.

BLANKETS

The same rules that apply to washing animal fibres in general apply to washing woolen blankets. Lukewarm water with a high stiff suds of mild soap is essential. If the binding is very dirty it should be gently rubbed with a soft brush and suds. Blankets should be dried in the shade (never in excessive heat) over two lines, if possible, to prevent sagging and stretching. In hanging blankets any stripes should be vertical, so that if the colors tend to run, such running will be down the stripe. When blankets are dry, the nap should be gently worked up with a soft brush.

KNITTED GARMENTS

In washing knitted garments, again the same rules apply as outlined for woolens in general. If the garment was said to be washable when purchased and if the tests show the color to be fast, then careful handling and a mild soap should keep it like new. Before wetting a knitted suit or sweater, place it on a piece of clean wrapping paper and draw an outline. This will serve as a guide in restoring the garment to the correct size after washing.

Remove buttons, buckles, and all unwashable trimmings from knitted or crocheted garments, and turn them wrong side out. To wash by hand gently squeeze rich, mild lukewarm or cool suds through and through the garment—without rubbing or twisting. Don't soak. Give it a brief second washing in fresh suds. The least possible handling is best.

Rinse knitted clothes in lukewarm or cool water. Squeeze out as much water as possible; then roll in a Turkish towel to absorb the moisture. Remove at once and gently ease to the outline, made for this purpose, pinning into place on a firm surface with rust-proof pins. As the ribbing at the cuff or bottom should fit snugly, do not stretch these portions—work them inward. The garment should still be kept wrong side out.

After stretching knitted or crocheted things into shape, dry them flat—in the shade. Never hang them over a line nor fasten with clothespins. Tissue paper between double thicknesses that are likely to be unfast, will help prevent streaking. To raise and straighten the nap of brushed wool, use a clean soft brush.

FINE SILK FABRICS

Always use mild, gentle soap for silks and synthetics, Lux or its equivalent, made especially for laundering fragile fabrics and brilliant colors. A harsh soap can weaken the fibers and fade colors. When washing delicate things in the Bendix it is often advisable to wash them in a net bag.

SILK STOCKINGS

Silk stockings should be washed by hand after each wearing for "second day" stockings do not fit well. Dirt and perspiration, if allowed to remain, may dull the color or injure delicate threads.

Before washing, turn stockings inside out. Then follow three steps:

Wash stockings in lukewarm or cool mild suds by gently squeezing the suds through and through. If stubborn spots remain, don't "rub them out" with bar soap, for this tends to roughen the surface and weaken threads. Remove spots by gently working dry soap flakes into them.

Rinse in lukewarm or cool water to remove every trace of suds. Never twist stockings. Squeeze out water, then roll in a Turkish towel to knead out moisture. Unroll at once and ease into shape, gently stretching the foot in length.

Hang silk stockings half and half over a line or rod. Dry stockings indoors or in the shade (never expose them to sunlight—never dry on a radiator). Silk stockings do not need to be ironed.

LINGERIE

Lingerie must be washed frequently—after each wearing. Never soak, most such garments absorb perspiration which must not remain in the fabric. To preserve its fresh color and strength, a high suds of mild soap should be used. After laundering, ease garments into shape and dry indoors or in the shade. Glove silk may shrink when wet, so stretch it after it has been damp-dried. Iron on the wrong side with a warm iron. Gently ease out satins and crepes. Lace should be ironed on the wrong side over a towel.

GLOVES

Wash fabric gloves frequently for embedded soil becomes hard to remove. After washing, stretch the gloves in length and hang in the shade to dry. Knitted gloves are dried flat on a towel.

Wash leather gloves only if they have been sold as washable. They should be washed on the hands in cool mild suds. Rinse in water of same temperature. (Chamois and doeskin gloves are not washed on the hands; they should be squeezed in the suds). To keep leather gloves soft and pliable, swish in clean light suds after rinsing. "Towel" out excess moisture. Unroll at once, ease into shape. Blow into gloves to puff them out. Dry indoors or in shade. As they are drying, gently stretch between fingers, to restore softness.

FOUNDATION GARMENT

Always remove unwashable trimmings. Wash in the Bendix for five minutes with high mild suds.

After removing the garment from the Bendix, ease it into shape by kneading in a Turkish towel. Dry indoors or in the shade, first loosening clasps to prevent rust from forming under the metal.

LACES

Delicate laces should be put in a fruit jar half-filled with lukewarm mild suds, shaken vigorously for a few minutes, then rinsed in the same way—using clear luke-warm water in the jar. Rare old lace can be safeguarded by attaching it to a piece of muslin before washing. Laces should be patted in a Turkish towel to remove moisture.

DIAPERS

Soiled diapers should be rinsed immediately in cold water and then soaked ten minutes in the Bendix with a suds of granulated soap held just a little above the center of the glass door. Also add 2 or 3 tablespoons of borax.

Before adding soap for the wash, dilute two or three tablespoonfuls of good disinfectant recommended by a doctor, in hot water and pour into the unit. Wash ten minutes in hot water.

It is not often necessary to boil diapers. One exception is when specifically ordered by a doctor because of infections.

CURTAINS AND DRAPERIES

Curtains and draperies can be laundered quickly and easily in the Bendix. For cretonne, colored cotton and linen, silk and rayon draperies, use a mild soap. For white and fast colors, wash in the Bendix for ten minutes in high suds with fabric dial set for "HOT." For colors, heavy and light soil, wash five minutes in the Bendix with fabric dial set for "Luke-Warm." Always wash curtains and drapes separately, handling with care when damp.

WASHABLE RUGS

Small chenille and other washable rugs may be washed in the Bendix with mild suds. Set the fabric dial for "Delicate Fabrics." It is best to wash each rug separately. Shake thoroughly to remove loose dirt and dust. If the rug is very dirty, use the soak period with suds. Wash in the Bendix for ten minutes. After washing, dry rugs in the shade. Be sure to clean the drain screen after washing, in some cases where ma-

terial with a great deal of lint is washed it is good practice to stop the unit and clean the screen at some point in the cycle, either after the soak period or the wash period.

STARCHING

The time for starching is immediately after damp-drying. The clothes should be damp. Good prepared starches are available at any grocery store; simply follow the directions on the package.

Keep the starch very thin for light starching—just enough to impart a slight glaze to the fabric after ironing. Too much starch makes clothes uncomfortable to wear and stiffens the fibres so that they crack easily and soon produce a rough scuffed edge.

For white clothes, the starch should be as hot as the hands can stand. First starch the garments or parts of clothes that are to be stiffest; then dilute to the proper consistency for clothes that are to be more lightly starched.

Always shake clothes out thoroughly before dipping them in starch, and hang out without delay. If left overnight, they may become moldy.

Light starching helps make colored garments look like new. By replacing the original finish of the fabric, light starching makes colored clothes look brighter and stay fresh longer. Be sure to starch colored clothes in a lukewarm solution to preserve the colors. All clothes, white and colored, are starched wrong side out. Very thin cottons may be rolled up tightly after starching, and ironed almost immediately—instead of being hung on the line. But not if there's any danger of colors bleeding. Never starch in the Bendix Home Laundry.

IMPORTANT FACTS CONCERNING THE BENDIX HOME LAUNDRY

WATER REQUIREMENTS

The Bendix Home Laundry is surprisingly frugal in the amount of water it uses, when it is considered that clean fresh water is used for every operation of every cycle. No water can ever be used more than once. As soon as an operation is completed, the dirty water is drained out and pumped away. The water consumption of the unit is somewhat variable, in most cases, however, it uses less than would be consumed in doing a washing in some old fashioned way, even when it is considered that most of the clothes would be washed in "USED" or "DIRTY" water the old way.

Several factors can cause a variation in the amount of water that will be required per cycle, such as the type of clothes being washed, water pressure and whether or not the soak period is used.

The accompanying chart, Figure 1, has been made on a standard unit under actual operating conditions, at pressures of 20, 40 and 60 pounds; with and without using the soak period and with the selector switch first on the "Luke-warm" position and then in the "Hot" position. This chart shows the amount of water consumed.

It will be noted that when considering mixed or lukewarm water, the relative amounts of hot and cold water required will vary with the temperature of both the hot and the cold water. The higher the temperature of the hot water the more cold water, of a given temperature, will be required to bring the hot water down to the lukewarm temperature. The higher the temperature of the hot water the less hot water required per load. The opposite is also true.

OPERATING PERIOD	CLOTHES LOAD	WATER PRESSURE	SELECTOR SWITCH	WATER TEMPERATURE		GALLONS WATER REQUIRED		
				HOT	COLD	HOT	COLD	TOTAL
WASH ONE RINSE TWO RINSE THREE TOTAL GALLONS	NINE POUNDS	20 POUNDS	LUKE-WARM	160° F.	60° F.	2.6	3.5	6.1
						1.2	1.3	2.7
						2.7	3.4	6.1
						1.3	1.5	2.8
						7.8	9.9	17.7
SOAK WASH ONE RINSE TWO RINSE THREE TOTAL GALLONS	NINE POUNDS	20 POUNDS	HOT	160° F.	60° F.	2.6	3.5	6.1
						4.6	0.0	4.6
						1.9	0.0	1.9
						2.7	3.4	6.1
						1.3	1.5	2.8
						13.1	8.4	21.5
WASH ONE RINSE TWO RINSE THREE TOTAL GALLONS	NINE POUNDS	40 POUNDS	LUKE-WARM	160° F.	60° F.	3.0	3.2	6.2
						2.1	2.0	4.1
						3.0	3.2	6.2
						2.1	2.1	4.2
						10.2	10.5	20.7
SOAK WASH ONE RINSE TWO RINSE THREE TOTAL GALLONS	NINE POUNDS	40 POUNDS	HOT	160° F.	60° F.	3.0	3.2	6.2
						4.7	0.0	4.7
						2.7	0.0	2.7
						3.0	3.2	6.2
						2.1	2.1	4.2
						15.5	8.5	24.0
WASH ONE RINSE TWO RINSE THREE TOTAL GALLONS	NINE POUNDS	60 POUNDS	LUKE-WARM	160° F.	60° F.	3.3	3.3	6.6
						2.6	2.5	5.1
						3.4	3.3	6.7
						2.6	2.5	5.1
						11.9	11.6	23.5
SOAK WASH ONE RINSE TWO RINSE THREE TOTAL GALLONS	NINE POUNDS	60 POUNDS	HOT	160° F.	60° F.	3.3	3.3	6.6
						5.0	0.0	5.0
						3.4	0.0	3.4
						3.4	3.3	6.7
						2.6	2.5	5.1
						17.7	9.1	26.8

Figure 1
Water Requirement Tests Made on a Standard Unit Under Varied Conditions

WATER LEVEL

The water level in the tub has a highly important relationship to the results that will be obtained. For purposes of water economy, the tub holds a comparatively small amount of water, just enough to give the proper results. For this reason it is important that the water level be maintained at exactly the correct point. The float controls this and should be adjusted so that the water level is exactly at the lip of the clothes door opening in the tub, without clothes in the cylinder.

WATER TEMPERATURE

A point that cannot be stressed too strongly, in considering any form of washing procedure, is the necessity of having real hot water and the Bendix Home Laundry is no exception. In order to obtain satisfactory results and the gleaming whiteness in cotton and linen clothes that is so desirable, it is essential that the hot water be at least 160 degrees Fahrenheit. One point that sometimes is misleading is the fact that most people are not able to accurately determine temperatures by "FEEL." The owner of a unit may "FEEL" the outside of the hot water tank and say that the water temperature is 160 degrees Fahrenheit, when more often than not it will actually measure only 120 or 125 degrees. Never guess at hot water temperatures, always use a thermometer to be sure!

HOT WATER SUPPLY

It is important that an adequate supply of hot water be available for use with the Bendix Home Laundry. It is not enough to have good hot water at the start of the wash and finish with cool water. The Bendix is automatic, but the unit cannot think and it will not stop to wait for the heater to recover and raise the temperature to the correct point.

As a general rule a Heating System having a 30 gallon minimum storage capacity and a recovery of from 20 to 30 gallons per hour will prove satisfactory, provided that the water is initially at least 160 degrees Fahrenheit and will recover to this temperature in the required time to allow the washing to proceed without interruption.

Following are some general recommendations, regarding various types of heating systems. These can be used as a guide, but it is not possible to foresee all circumstances. For example, a heating system having adequate rated capacity may fail to produce satisfactory results because of a heavy lime deposit.

GAS—SIDE ARM COIL—MANUAL: Examine name plate. Burners rated at 20,000 B.T.U. or more, having 30 gallons storage capacity or more are usually satisfactory.

GAS—AUTOMATIC—STORAGE: Burners rated at 20,000 B.T.U. or more, having 30 gallons storage capacity or more, are usually satisfactory. A slow recovery heater having a burner rated below 20,00 B.T.U. is usually not satisfactory.

GAS—AUTOMATIC—INSTANTANEOUS: A heater without storage capacity with a heating capacity of 2 gallons or more per minute (60 degree Fahrenheit rise) is usually satisfactory.

ELECTRIC—AUTOMATIC—STORAGE: Most electric water heaters are operated at night (OFF-PEAK) and have an auxiliary heating unit for day time operation. A Minimum storage capacity of 60 gallons, will usually prove sufficient for a small family. 80 and 86 gallon tanks are more desirable.

OIL—AUTOMATIC: An oil burning heater, either with separate or built in storage, having an hourly heating capacity of 30 gallons or more is usually satisfactory.

INDIRECT — COIL OR TUBE: An indirect heater is one where steam or hot water from the house heating system is used to heat the water. This type of system is usually not satisfactory at all seasons of the year, therefore, an auxiliary heater of some conventional type is required.

SPLIT SYSTEMS: Some steam and hot water house heating systems, especially those fired by oil, provide a year around hot water supply. Where the storage tank has a capacity of 50 gallons or more, the system will usually be found satisfactory.

FURNACE COILS: Usually same conditions as "Indirect Systems".

POT STOVE—COAL FIRED: Heaters with 30 to 40 gallons storage capacity or more and a minimum heating capacity of 110 gallons per 6 hours are usually satisfactory.

SOLAR SYSTEMS: Usually unsatisfactory, unless used in conjunction with an auxiliary heating system of the conventional type to raise the water temperature the desired amount at all seasons of the year.

LUKE-WARM WATER

The luke-warm water temperature is controlled by the thermostat in the unit. For most conditions it will be found that a temperature of from 98 to 100 degrees Fahrenheit will be most satisfactory.

SOAP LEVEL

Maintaining the correct soap level in the Bendix Home Laundry has an important bearing on the results that will be obtained. In the soak period with cottons and linens a suds should be built and maintained between just a little above the center of the glass door to about three quarters of the way up on the glass door. In the wash period the suds level should be maintained at a point just a little above the half way mark on the door. With delicate fabrics the suds level should be built to and maintained at the top of the glass door in both the soak and wash periods. The important thing to remember is that the suds level must be maintained during the entire wash or soak period as the case may be. Suds hold the dirt in suspension which has been flushed from the fabric and if the suds become saturated before the wash is completed they become weak and fall, releasing the dirt which in turn will be redeposited on

the clothes. If suds tend to fall, soap should be added to maintain them at the proper level.

Under most circumstances, when washing cottons or linens, best results will be obtained by using a 10 minute soak period with suds and a 10 minute wash period with suds. For delicate fabrics variations may be required, as outlined previously.

Allowing suds to become saturated will allow dirt to redeposit on the material being washed, and this also, along with using too much soap or softener or washing too large a load may cause a deposit to form on the inside of the unit which will make cleaning necessary.

CYLINDER SPEED

The drive pulley on some earlier units is made adjustable because it is absolutely essential in obtaining good results that the speed of the cylinder for soaking, washing and rinsing be 59 revolutions per minute. (A variation of one revolution per minute, plus or minus, is allowable). This adjustment must be made on each unit when it is installed. Turning the adjusting screws clockwise increases the speed and turning them counter-clockwise decreases the speed of the cylinder. When making this adjustment the unit should be loaded with water or water and clothes. After the adjustment has been completed the adjusting screws must be locked with the locking washers provided to prevent any possibility of speed varying. Later units have a non-adjustable drive pulley, and do not require this attention.

THE DRAIN SCREEN

The unit is equipped with a readily accessible drain screen and case, or drawer, located behind the small door on the front of the cabinet which is directly below the clothes door.

Each New Bendix owner must be carefully instructed regarding the location of the drain screen, the importance of cleaning it, and the proper method to follow. Few types of material contain or pick up enough lint to fill the screen; however, the owner should be instructed to clean this screen after each wash so that it will not be forgotten long enough to allow it to become filled.

A good procedure to follow is for the demonstrator or installation man to show the new owner the location of the screen and demonstrate its removal and replacement. Then the owner should be asked to remove and replace it once to be sure the procedure is understood.

In some cases, especially when washing new fabrics such as blankets and rugs that may contain an unusual amount of lint, it is advisable to stop the unit during the cycle and clean the drain screen. This can be accomplished readily at the end of the soak period. If desired this can be done at the end of the wash period. The time control knob can be advanced to the rinse mark from which point the unit will drain and stop. The drain screen can then be cleaned and after this has been done the knob can be advanced to the point from which it was moved.

SECTION VIII

SOME FACTS ABOUT PORCELAIN ENAMEL

ALL MAJOR PARTS OF BENDIX HOME LAUNDRIES ABOVE SERIAL NO. 84,000 THAT COME IN CONTACT WITH THE SOAPY WASH WATER ARE FINISHED IN PORCELAIN ENAMEL.

This fact at first does not seem particularly important, but a glimpse into the history of the enameling will show what this means to Bendix users in assuring them of a durable, trouble-free product. The following paragraphs are taken from the book, "A Manual of Porcelain Enameling", and are reproduced in this booklet by permission of The Ferro Enamel Corporation, Cleveland, Ohio.

"The method of covering metallic objects with a coating of vitreous enamels is one that dates back to the ancients. Various pieces of gold, silver, and copper enameled ware, as well as pieces of enameled earthenware, are in existence which evidence the fact that the Egyptian, Greek and Byzantine people practiced the art. There is also proof that the Irish were making enamel pieces before the rise of the civilization in the British Isles, and that the Chinese and Japanese practiced the art after the travels of Marco Polo.

"Porcelain enamel or vitreous enamel is a glassy composition applied to metal and fused thereon at a low-red to bright-red heat; although it is a glass, it must adhere to metal

and resist punishment, both by impact and by rapid changes of temperature. This requirement necessitates the addition of other ingredients besides those used in the manufacture of ordinary glass, such as window glass, bottle glass or plate glass. In general, an enamel may be said to be a borosilicate of sodium, potassium, calcium, and aluminum and sometimes of lead, zinc, or barium. Other substances may be added for special purposes, in order to increase the strength or gloss, or to render the enamel a certain color.

"In general, a high quality white enamel is applied over a ground coat, while colored enamels are applied directly on the metal without a ground coat, as also may be white enamel where extra high quality is not absolutely necessary.

"Since porcelain or vitreous enamel is a glass applied on metal, the manufacturer and the user thereof, should keep in mind the properties of glass and to a large degree treat the enamel as such. Although enamels are compounded to make them comparatively tough and elastic and are applied on metal which has considerable strength, they are nevertheless easily injured by extremely rough handling. One prominent manufacturer of enameled ware says, 'We recommend the same hammer test for enamel that we recommend for plate glass' and there is more truth than poetry in his statement."

SERVICE POLICY AND REPLACEMENT PARTS INFORMATION

To assure a complete understanding of warranty policy, parts orders, etc., the Factory furnishes a pamphlet dealing with such items and other similar procedure. This is available to authorized Bendix Laundry serv-

ice agencies only, and should be obtained from the Bendix Home Laundry Distributorship covering each respective authorized service agency's territory, and will be sent at no charge.